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Section H

Electricity

World Intellectual Property Organization

SECTION H – ELECTRICITY

CONTENTS OF SECTION
(References and notes omitted)

SECTION H – ELECTRICITY

Note

These Notes cover the basic principles and general instructions for use of section H.

(I) Section H covers:
- (a) basic electric elements, which cover all electric units and the general mechanical structure of apparatus and circuits, including the assembly of various basic elements into what are called printed circuits and also cover to a certain extent the manufacture of these elements (when not covered elsewhere);
- (b) generation of electricity, which covers the generation, conversion and distribution of electricity together with the controlling of the corresponding gear;
- (c) applied electricity, which covers:
  - (i) general utilisation techniques, viz. those of electric heating and electric lighting circuits;
  - (ii) some special utilisation techniques, either electric or electronic in the strict sense, which are not covered by other sections of the Classification, including:
    - (1) electric light sources, including lasers;
    - (2) electric X-ray technique;
    - (3) electric plasma technique and the generation and acceleration of electrically charged particles or neutrons;
- (d) basic electronic circuits and their control;
- (e) radio or electric communication technique;
- (f) the use of a specified material for the manufacture of the article or element described. In this connection, paragraphs 88 to 90 of the Guide should be referred to.

(II) In this section, the following general rules apply:
- (a) Subject to the exceptions stated in I(c), above, any electric aspect or part peculiar to a particular operation, process, apparatus, object or article, classified in one of the sections of the Classification other than section H, is always classified in the subclass for that operation, process, apparatus, object or article. Where common characteristics concerning technical subjects of similar nature have been brought out at class level, the electric aspect or part is classified, in conjunction with the operation, process, apparatus, object or article, in a subclass which covers entirely the general electrical applications for the technical subject in question;
- (b) The electrical applications referred to under (a), above, either general or particular, include:
  - (i) the therapeutic processes and apparatus, in class A61;
  - (ii) the electric processes and apparatus used in various laboratory or industrial operations, in classes B01 and B03 and in subclass B23K;
  - (iii) the electricity supply, electric propulsion and electric lighting of vehicles in general and of particular vehicles, in the subsection “Transporting” of section B;
  - (iv) the electric ignition systems of internal-combustion engines, in subclass F02P, and of combustion apparatus in general, in subclass F23Q;
  - (v) the whole electrical part of section G, i.e. measuring devices including apparatus for measuring electric variables, checking, signalling and calculating. Electricity in that section is generally dealt with as a means and not as an end in itself;
- (c) All electrical applications, both general and particular, presuppose that the “basic electricity” aspect appears in section H (see I(a) above) as regards the electric “basic elements” which they comprise. This rule is also valid for applied electricity, referred to in I(c), above, which appears in section H itself.

(III) In this section, the following special cases occur:
- (a) Among the general applications covered by sections other than section H, it is worth noting that electric heating in general is covered by subclasses F24D or F24H or class F27, and that electric lighting in general is partly covered by class F21, since in section H (see I(c), above) there are places in H05B which cover the same technical subjects;
- (b) In the two cases referred to under (a), above, the subclasses of section F, which deal with the respective subjects, essentially cover in the first place the whole mechanical aspect of the apparatus or devices, whereas the electrical aspect, as such, is covered by subclass H05B;
- (c) In the case of lighting, this mechanical aspect should be taken to cover the material arrangement of the various electric elements, i.e., their geometrical or physical position in relation to one another; this aspect is covered by subclass F21V, the elements themselves and the primary circuits remaining in section H. The same applies to electric light sources, when combined with light sources of a different kind. These are covered by subclass H05B, whereas the physical arrangement which their combination constitutes is covered by the various subclasses of class F21;
- (d) As regards heating, not only the electric elements and circuitry designs, as such, are covered by subclass H05B, but also the electric aspects of their arrangement, where these concern cases of general application; electric furnaces being considered as such. The physical disposition of the electric elements in furnaces is covered by section F. If a comparison is made with electric welding circuits, which are covered by subclass B23K in connection with welding, it can be seen that electric heating is not covered by the general rule stated in II, above.

H01 BASIC ELECTRIC ELEMENTS

Notes

(1) Processes involving only a single technical art, e.g. drying, coating, for which provision exists elsewhere are classified in the relevant class for that art.

(2) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

H01B CABLES; **CONDUCTORS**; **INSULATORS**; **SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES** (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cables or lines H02G)

Subclass Index

1/00 Conductors or conductive bodies characterised by the conductive materials; **Selection of materials as conductors** (superconductive or hyperconductive conductors, cables, or transmission lines characterised by the materials H01B 12/00; resistors H01C; details of devices using superconductivity or hyperconductivity, characterised by the material H01L 39/12) **[4]**

Note

Groups H01B 1/14 to H01B 1/24 take precedence over groups H01B 1/02 to H01B 1/06. **[3]**

1/02 . mainly consisting of metals or alloys
1/04 . mainly consisting of carbon-silicon compounds, carbon, or silicon
1/06 . mainly consisting of other non-metallic substances
1/08 . . oxides
1/12 . . organic substances **[3]**
1/14 . Conductive material dispersed in non-conductive inorganic material **[3]**
1/20 . Conductive material dispersed in non-conductive organic material **[3]**
1/22 . . the conductive material comprising metals or alloys **[3]**
1/24 . . the conductive material comprising carbon-silicon compounds, carbon, or silicon **[3]**

3/00 Insulators or insulating bodies characterised by the insulating materials; **Selection of materials for their insulating or dielectric properties** (selection of piezo-electric or electrostrictive materials H01L 41/00)

3/02 . mainly consisting of inorganic substances
3/12 . . ceramics
3/18 . mainly consisting of organic substances
3/30 . . plastics; resins; waxes

Note

Group H01B 3/47 takes precedence over groups H01B 3/32 to H01B 3/46. **[8]**

3/32 . . . natural resins
3/34 . . . waxes (silicone waxes H01B 3/46)
3/36 . . . condensation products of phenols with aldehydes or ketones
3/38 . . . condensation products of aldehydes with amines or amides
3/40 . . . epoxy resins
3/42 . . . polyesters; polyethers; polyacetals
3/44 . . . vinyl resins; acrylic resins (silicones H01B 3/46)
3/46 . . . silicones
3/47 . . . fibre-reinforced plastics, e.g. glass-reinforced plastics **[8]**

Note

Group H01B 12/00 takes precedence over groups H01B 5/00 to H01B 11/00.

5/00 Non-insulated conductors or conductive bodies characterised by their form

5/14 . comprising conductive layers or films on insulating-supports (insulating-layers or insulating-films on metal bodies H01B 17/56)
5/16 . comprising conductive material in insulating or poorly conductive material, e.g. conductive rubber (H01B 1/14, H01B 1/20 take precedence; insulating bodies with conductive admixtures H01B 17/56; conductive paints C09D 5/24) **[3]**

7/00 Insulated conductors or cables characterised by their form

7/02 . Disposition of insulation (materials H01B 3/00; insulators H01B 17/00)
7/04 . Flexible cables, conductors, or cords, e.g. trailing cables
7/06 . Extensible conductors or cables, e.g. self-coiling cords (arrangements for storing and repeatedly paying-out and re-storing lengths of conductors or cables B65H 75/34)
7/08 . Flat or ribbon cables
7/10 . Contact cables, i.e. having conductors which may be brought into contact by distortion of the cable
7/12 . Floating cables (installations of cables supported on or from floats H02G 9/00)
7/14 . Submarine cables
7/16 . Rigid-tube cables (heating elements of similar construction H05B)
7/17 . Protection against damage caused by external factors, e.g. sheaths or armouring (power cables with screens H01B 9/00; communication cables with screens H01B 11/02; installation of conduits H02G) **[7]**
7/18 . . by wear, mechanical force or pressure **[1,7]**
7/30 . with arrangements for reducing conductor losses when carrying ac, e.g. due to skin effect

7/32 . with arrangements for indicating defects, e.g. breaks, leaks (locating defects by measuring G01)
7/36 . with distinguishing or length marks

9/00 Power cables

11/00 Communication cables or conductors (waveguides H01P)
11/02 . Cables with twisted pairs or quads (transposing, crossing, or twisting at joints H04B; balancing of earth capacitance H04B)
11/18 . Coaxial cables; Analogous cables having more than one inner conductor within a common outer conductor (suitable for handling frequencies considerably beyond the audio range H01P 3/02)

12/00 Superconductive or hyperconductive conductors, cables, or transmission lines (superconductors characterised by the ceramic-forming technique or the ceramic composition C04B 35/00; details or devices using superconductivity or hyperconductivity characterised by the material H01L 39/12) **[2,4]**
12/02 . characterised by their form **[4]**

Note

Group H01B 12/12 takes precedence over groups H01B 12/04 to H01B 12/10. **[4]**

12/04 . . Single wire **[4]**
12/06 . . Films or wires on bases or cores **[4]**
12/08 . . Stranded or braided wires **[4]**
12/10 . . Multi-filaments embedded in normal conductors **[4]**
12/12 . . Hollow conductors **[4]**
12/14 . characterised by the disposition of thermal insulation **[4]**
12/16 . characterised by cooling **[4]**

13/00 Apparatus or processes specially adapted for manufacturing conductors or cables
13/02 . Stranding-up (stranding-up ropes D07B)
13/06 . Insulating conductors or cables (H01B 13/32 takes precedence) **[4]**
13/22 . Sheathing; Armouring; Screening; Applying other protective layers (H01B 13/32 takes precedence) **[4]**
13/28 . Applying continuous inductive loading, e.g. Krarup loading
13/30 . Drying (in general F26B); Impregnating (H01B 13/32 takes precedence) **[4]**
13/32 . Filling or coating with impervious material (for cable installations H02G 15/00) **[4]**

15/00 Apparatus or processes for salvaging material from cables (insulated conductors or cables with arrangements for facilitating removal of insulation H01B 7/00; methods or apparatus specially adapted for removing insulation from conductors H02G 1/12)

17/00 Insulators or insulating bodies characterised by their form (section insulators for electric traction B60M 1/00; insulating rail-joints E01B 11/00)
17/02 . Suspension insulators; Strain insulators
17/14 . Supporting insulators (pin insulators H01B 17/00; apertured insulators H01B 17/00)
17/26 . Lead-in insulators; Lead-through insulators
17/42 . Means for obtaining improved distribution of voltage (capacitor-type lead-through insulators H01B 17/26); Protection against arc discharges
17/56 . Insulating bodies
17/58 . . Tubes, sleeves, beads, or bobbins through which the conductor passes (protective tubings for the installation of lines or cables in buildings H02G 3/04)

19/00 Apparatus or processes specially adapted for manufacturing insulators or insulating bodies

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H01C RESISTORS

Notes

(1) In this subclass, the following term is used with the meaning indicated:
– "adjustable" means mechanically adjustable. **[2]**
(2) Variable resistors, the value of which is changed non-mechanically, e.g. by voltage or temperature, are classified in group H01C 7/00. **[2]**

Subclass Index

1/00 Details
1/01 . Mounting; Supporting **[2]**
1/02 . Housing; Enclosing; Embedding; Filling the housing or enclosure **[2]**
1/06 . Electrostatic or electromagnetic shielding arrangements
1/14 . Terminals or tapping points specially adapted for resistors (in general H01R); Arrangements of terminals or tapping points on resistors

3/00 Non-adjustable metal resistors made of wire or ribbon, e.g. coiled, woven, or formed as grids

7/00 **Non-adjustable resistors formed as one or more layers or coatings**; **Non-adjustable resistors made from powdered conducting material or powdered semi-conducting material with or without insulating material** (consisting of loose powdered or granular material H01C 8/00; resistors with a potential-jump barrier or surface barrier, e.g. field effect resistors, H01L 29/00; semiconductor devices sensitive to electromagnetic or corpuscular radiation, e.g. photoresistors, H01L 31/00; devices using superconductivity or hyperconductivity H01L 39/00; devices using galvano-magnetic or similar magnetic effects, e.g. magnetic-field-controlled resistors, H01L 43/00; solid state devices for rectifying, amplifying, oscillating, or switching without a potential-jump barrier or surface barrier H01L 45/00; bulk negative resistance effect devices H01L 47/00) **[2]**

7/02 . having positive temperature coefficient

7/04 . having negative temperature coefficient

7/06 . including means to minimise changes in resistance with changes in temperature

7/10 . voltage responsive, i.e. varistors **[6]**

7/102 . . Varistor boundary, e.g. surface layers (H01C 7/12 takes precedence) **[6]**

7/105 . . Varistor cores (H01C 7/12 takes precedence) **[6]**

7/12 . . Overvoltage protection resistors; Arresters **[3]**

7/13 . current-responsive **[2]**

Note

Groups H01C 7/02 to H01C 7/13 take precedence over groups H01C 7/18 to H01C 7/22. **[2]**

7/18 . comprising a plurality of layers stacked between terminals **[2]**

7/20 . the resistive layer or coating being tapered **[2]**

7/22 . Elongated resistive element being bent or curved, e.g. sinusoidal, helical **[2]**

8/00 **Non-adjustable resistors consisting of loose powdered or granular conducting, or powdered or granular semi-conducting material [2]**

10/00 **Adjustable resistors [2]**

11/00 **Non-adjustable liquid resistors [2]**

13/00 **Resistors not provided for elsewhere**

17/00 **Apparatus or processes specially adapted for manufacturing resistors** (providing fillings for housings or enclosures H01C 1/02; reducing insulation surrounding a resistor to powder H01C 1/02; manufacture of thermally variable resistors H01C 7/02, H01C 7/04) **[2]**

17/06 . adapted for coating resistive material on a base **[2]**

17/075 . . by thin-film techniques **[6]**

17/22 . adapted for trimming **[2]**

17/28 . adapted for applying terminals **[2]**

H01F **MAGNETS**; **INDUCTANCES**; **TRANSFORMERS**; **SELECTION OF MATERIALS FOR THEIR MAGNETIC PROPERTIES** (ceramics based on ferrites C04B 35/26; alloys C22C; thermomagnetic devices H01L 37/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R) **[2]**

Subclass Index

1/00 **Magnets or magnetic bodies characterised by the magnetic materials therefor**; **Selection of materials for their magnetic properties** (thin magnetic films characterised by their composition H01F 10/10)

1/01 . of inorganic materials (H01F 1/44 takes precedence) **[6]**

1/03 . . characterised by their coercivity **[6]**

Note

Group H01F 1/40 takes precedence over H01F 1/03 **[6]**

1/032 . . . of hard-magnetic materials **[6]**

1/12 . . . of soft-magnetic materials **[6]**

1/40 . . of magnetic semiconductor materials, e.g. $CdCr_2S_4$ (devices using galvano-magnetic or similar effects H01L 43/00) **[6]**

1/44 . of magnetic liquids, e.g. ferrofluids (particles in a bonding agent H01F 1/12) **[6]**

3/00 **Cores, yokes, or armatures** (magnetic materials H01F 1/00; permanent magnets H01F 7/02)

5/00 **Coils** (superconducting coils H01F 6/06; fixed inductances of the signal type H01F 17/00)

5/02 . wound on non-magnetic supports, e.g. formers

5/06 . Insulation of windings

6/00 **Superconducting magnets**; **Superconducting coils [6]**

6/06 . Coils, e.g. winding, insulating, terminating or casing arrangements therefor **[6]**

7/00 **Magnets** (superconducting magnets H01F 6/00; for separation of solid materials from solid materials or fluids B03C 1/00; for bench or like work-holders B23B 31/02, B23Q 3/00; work-holding devices B25B 11/00; lifting magnets B66C 1/00; for electric meters G01R; for relays H01H; for dynamo-electric machines H02K)

7/02 . Permanent magnets

7/04 . . Means for releasing the attractive force

7/06 . Electromagnets; Actuators including electromagnets **[6]**

7/08 . . with armatures

7/20 . . without armatures (cores H01F 3/00; coils H01F 5/00)

10/00 **Thin magnetic films, e.g. of one-domain structure** (magnetic record carriers G11B 5/00; thin-film magnetic stores G11C)

10/08 . characterised by magnetic layers (applying magnetic films to substrates H01F 41/14) **[3]**

10/10 . . characterised by the composition **[3]**

10/12 . . . being metals or alloys (intermetallic compounds H01F 10/10) **[3]**

13/00 **Apparatus or processes for magnetising or demagnetising** (for degaussing ships B63G 9/00; for clocks or watches G04D 9/00; demagnetising arrangements for colour television H04N 9/16)

Note

Groups H01F 17/00 to H01F 38/00, with the exception of groups H01F 27/42 and H01F 38/28, cover only structural or constructional aspects of transformers, inductive reactors, chokes or the like. These groups do not cover circuit arrangement of such devices, which are covered by the appropriate functional places. **[6]**

17/00 **Fixed inductances of the signal type** (coils in general H01F 5/00)

17/02 . without magnetic core

17/04 . with magnetic core

17/06 . . with core substantially closed in itself, e.g. toroid

19/00 **Fixed transformers or mutual inductances of the signal type** (H01F 36/00 takes precedence) **[3]**

21/00 **Variable inductances or transformers of the signal type** (H01F 36/00 takes precedence) **[3]**

21/02 . continuously variable, e.g. variometers

21/12 . discontinuously variable, e.g. tapped

27/00 **Details of transformers or inductances, in general [6]**

27/02 . Casings

27/06 . Mounting, supporting, or suspending transformers, reactors, or choke coils

27/08 . Cooling (heat-transfer elements F28F); Ventilating (structural details of casings H01F 27/02)

27/10 . . Liquid cooling

27/24 . Magnetic cores

27/245 . . made from sheets, e.g. grain-oriented (H01F 27/26 takes precedence) **[5]**

27/25 . . made from strips or ribbons (H01F 27/26 takes precedence) **[5]**

27/255 . . made from particles (H01F 27/26 takes precedence) **[5]**

27/26 . . Fastening parts of the core together; Fastening or mounting the core on casing or support (on coil H01F 27/30)

27/28 . Coils; Windings; Conductive connections

27/29 . . Terminals; Tapping arrangements **[6]**

27/30 . . Fastening or clamping coils, windings, or parts thereof together; Fastening or mounting coils or windings on core, casing, or other support

27/32 . . Insulating of coils, windings, or parts thereof

27/33 . Arrangements for noise damping

27/34 . Special means for preventing or reducing unwanted electric or magnetic effects, e.g. no-load losses, reactive currents, harmonics, oscillations, leakage fields

27/42 . Circuits specially adapted for the purpose of modifying, or compensating for, electric characteristics of transformers, reactors, or choke coils (circuits for controlling transformers, reactors or choke coils, for the purpose of obtaining a desired output H02P 13/00; impedance networks H03H) **[6]**

29/00 **Variable transformers or inductances not covered by group H01F 21/00**

30/00 **Fixed transformers not covered by group H01F 19/00 [6]**

30/06 . characterised by the structure **[6]**

36/00 **Transformers with superconductive windings or with windings operating at cryogenic temperatures** (superconducting magnets or superconducting coils H01F 6/00) **[3]**

37/00 **Fixed inductances not covered by group H01F 17/00 [6]**

38/00 **Adaptations of transformers or inductances for specific applications or functions [6]**

38/14 . Inductive couplings **[6]**

38/20 . Instrument transformers **[6]**

38/22 . . for single phase ac **[6]**

38/28 . . . Current transformers **[6]**

41/00 **Apparatus or processes specially adapted for manufacturing or assembling the devices covered by this subclass**

41/02 . for manufacturing cores, coils, or magnets (H01F 41/14 takes precedence; for dynamo-electric machines H02K 15/00) **[3]**

41/04 . . for manufacturing coils

41/06 . . . Winding

41/10 . . . Connecting leads to windings (making electric connections in general H01R 43/00)

41/12 . . . Insulating of windings (of conductors in general H01B 13/06)

41/14 . for applying magnetic films to substrates (covering metals, or materials with metals, in general C23C; manufacturing record carriers G11B 5/84) **[3]**

H01G CAPACITORS; **CAPACITORS, RECTIFIERS, DETECTORS, SWITCHING DEVICES, LIGHT-SENSITIVE OR TEMPERATURE-SENSITIVE DEVICES OF THE ELECTROLYTIC TYPE** (selection of specified materials as dielectric H01B 3/00; capacitors with potential-jump or surface barrier H01L 29/00)

Subclass Index

2/00 Details applicable to more than one of groups H01G 4/00 to H01G 9/00 [6]

4/00 Fixed capacitors; **Processes of their manufacture** (electrolytic capacitors H01G 9/00) **[2]**

4/002 . Details **[6]**
4/005 . . Electrodes **[6]**
4/008 . . . Selection of materials **[6]**
4/018 . . Dielectrics **[6]**
4/06 . . . Solid dielectrics **[2,6]**
4/08 . . . . Inorganic dielectrics **[2,6]**
4/12 . . . . . Ceramic dielectrics **[2,6]**
4/14 . . . . Organic dielectrics **[2,6]**
4/228 . . Terminals **[6]**
4/26 . Folded capacitors **[2]**
4/28 . Tubular capacitors **[2]**
4/30 . Stacked capacitors (H01G 4/33 takes precedence) **[2,6]**
4/32 . Wound capacitors **[2]**
4/33 . Thin- or thick-film capacitors (thin- or thick-film circuits H01L 27/00) **[6]**
4/35 . Feed-through capacitors or anti-noise capacitors **[6]**
4/38 . Multiple capacitors, i.e. structural combinations of fixed capacitors **[2]**
4/40 . Structural combinations of fixed capacitors with other electric elements not covered by this subclass, the structure mainly consisting of a capacitor, e.g. RC combinations (thin-or thick-film circuits H01L 27/00; RC-filters H03H) **[2]**

5/00 Capacitors in which the capacitance is varied by mechanical means, e.g. by turning a shaft; **Processes of their manufacture [2]**

7/00 Capacitors in which the capacitance is varied by non-mechanical means; **Processes of their manufacture [2]**

9/00 Electrolytic capacitors, rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices; **Processes of their manufacture [2]**

9/004 . Details **[6]**
9/008 . . Terminals **[6]**
9/02 . . Diaphragms; Separators **[6]**
9/022 . . Electrolytes, absorbents (electrolytic or electrophoretic processes, apparatus therefor C25; for primary, secondary or fuel cells H01M) **[6]**
9/04 . . Electrodes **[6]**
9/042 . . . characterised by the material (H01G 9/058 takes precedence) **[6]**
9/048 . . . characterised by their structure (H01G 9/058 takes precedence) **[6]**
9/058 . . . specially adapted for double-layer capacitors **[6]**
9/06 . . . Mounting in containers **[6]**
9/08 . . Housing; Encapsulation **[6]**
9/10 . . . Sealing, e.g. of lead-in wires **[6]**
9/145 . Liquid electrolytic capacitors (H01G 9/155 takes precedence) **[6]**
9/15 . Solid electrolytic capacitors (H01G 9/155 takes precedence) **[6]**
9/155 . Double-layer capacitors **[6]**
9/16 . specially adapted for use as rectifiers or detectors (H01G 9/22 takes precedence)
9/18 . Self-interrupters
9/20 . Light-sensitive devices
9/21 . Temperature-sensitive devices **[6]**
9/22 . Devices using combined reduction and oxidation, e.g. redox arrangement, solion
9/26 . Structural combinations of electrolytic capacitors, rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices with each other **[6]**
9/28 . Structural combinations of electrolytic capacitors, rectifiers, detectors, switching devices with other electric components not covered by this subclass **[6]**

13/00 Apparatus specially adapted for manufacturing capacitors; **Processes specially adapted for manufacturing capacitors not provided for in groups H01G 4/00 to H01G 9/00 [2]**

13/02 . Machines for winding capacitors **[2]**
13/04 . Drying (in general F26B); Impregnating **[2]**
13/06 . with provision for removing metal surfaces **[2]**

15/00 Structural combinations of capacitors or other devices covered by at least two different main groups of this subclass with each other [6]

17/00 Structural combinations of capacitors or other devices covered by at least two different main groups of this subclass with other electric elements, not covered by this subclass, e.g. RC combinations (thin- or thick-film circuits H01L 27/00; RC-filters H03H) **[6]**

H01H **ELECTRIC SWITCHES**; **RELAYS**; **SELECTORS**; **EMERGENCY PROTECTIVE DEVICES** (contact cables H01B 7/10; electrolytic self-interrupters H01G 9/18; emergency protective circuit arrangements H02H; switching by electronic means without contact-making H03K 17/00)

Notes

(1) This subclass covers (in groups H01H 69/00 to H01H 87/00) devices for the protection of electric lines or electric machines or apparatus in the event of undesired change from normal electric working conditions, the electrical condition serving directly as the input to the device.

(2) This subclass does not cover bases, casings, or covers accommodating two or more switching devices or for accommodating a switching device as well as another electric component, e.g. bus-bar, line connector. Those bases, casings or covers are covered by group H02B 1/00.

(3) In this subclass, the following terms or expressions are used with the meanings indicated:
- "relay" means a switching device having contacts which are operated from electric inputs which supply, directly or indirectly, all the mechanical energy necessary to cause both the closure and the opening of the contacts;
- "driving mechanism" refers to the means by which an operating force applied to the switch is transmitted to the moving contact or contacts;
- "operating" is used in a broader sense than "actuating" which is reserved for those parts not touched by hand to effect switching;
- "acting" or "action" means a self-induced movements of parts at one stage of the switching. These connotations apply to all parts of the verbs "to operate"; "to actuate", and "to act", and to words derived therefrom, e.g. to "actuation".

(4) In this subclass, details are classified as follows:
- details of an unspecified type of switching device, or disclosed as applicable to two or more kinds of switching devices designated by the terms or expressions "switches", "relays", "selector switches", and "emergency protective devices", are classified in groups H01H 1/00 to H01H 9/00;
- details of an unspecified type of switch, or disclosed as applicable to two or more types of switches as defined by groups H01H 13/00 to H01H 43/00 and subgroups H01H 35/02, H01H 35/06, H01H 35/14, H01H 35/18, H01H 35/24, and H01H 35/42, all hereinafter called basic types, are classified in groups H01H 1/00 to H01H 9/00;
- details of an unspecified type of relay, or disclosed as applicable to two or more types of relays as defined by groups H01H 51/00 to H01H 61/00, hereinafter called basic types, are classified in group H01H 45/00;
- details of an unspecified protective device, or applicable to two or more types of protective devices as defined by groups H01H 73/00 to H01H 83/00, hereinafter called basic types, are classified in group H01H 71/00.
- However, details only described with reference to, or clearly only applicable to, switching devices of a single basic type, are classified in the group appropriate to switching devices of that basic type, e.g. H01H 19/00, H01H 75/00;
- mechanical structural details of control members of switches or of keyboards such as keys, push-buttons, levers or other mechanisms for transferring the force to the activated elements are classified in this subclass, even when they are used for controlling electronic switches.

However, mechanical details directly producing electronic effects are classified in group H03K 17/94. **[4]**

Subclass Index

Electric switches

1/00 **Contacts** (liquid contacts H01H 29/00)
1/02 . characterised by the material thereof
1/06 . characterised by the shape or structure of the contact-making surface, e.g. grooved
1/12 . characterised by the manner in which co-operating contacts engage

3/00 **Mechanisms for operating contacts** (thermal actuating or release means H01H 37/00)
3/02 . Operating parts, i.e. for operating driving mechanism by a mechanical force external to the switch
3/16 . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. for a door switch, a limit switch, a floor-levelling switch of a lift
3/32 . Driving mechanisms, i.e. for transmitting driving force to the contacts (snap-action arrangements H01H 5/00; introducing a predetermined time delay H01H 7/00)
3/54 . Mechanisms for coupling or uncoupling operating parts, driving mechanisms, or contacts

5/00 **Snap-action arrangements, i.e. in which during a single opening operation or a single closing operation energy is first stored and then released to produce or assist the contact movement**

7/00 **Devices for introducing a predetermined time delay between the initiation of the switching operation and the opening or closing of the contacts** (time or time-programme switches H01H 43/00)

9/00 **Details of switching devices, not covered by groups H01H 1/00 to H01H 7/00**
9/02 . Bases, casings, or covers (accommodating more than one switch or a switch and another electrical component H02B 1/00)
9/04 . . Dustproof, splashproof, drip-proof, waterproof, or flameproof casings
9/16 . Indicators for switching condition, e.g. "on" or "off"
9/18 . Distinguishing marks on switches, e.g. for indicating switch location in the dark; Adaptation of switches to receive distinguishing marks
9/20 . Interlocking, locking, or latching mechanisms
9/30 . Means for extinguishing or preventing arc between current-carrying parts
9/54 . Circuit arrangements not adapted to a particular application of the switching device and for which no provision exists elsewhere

11/00 **Apparatus or processes specially adapted for the manufacture of electric switches** (processes specially adapted for manufacture of rectilinearly movable switches having a plurality of operating members associated with different sets of contacts, e.g. keyboards, H01H 13/70) **[1,8]**
11/04 . of switch contacts

13/00 **Switches having rectilinearly-movable operating part or parts adapted for pushing or pulling in one direction only, e.g. push-button switch** (wherein the operating part is flexible H01H 17/00)
13/02 . Details **[1,8]**
13/04 . . Cases; Covers
13/12 . . Movable parts; Contacts mounted thereon
13/14 . . . Operating parts, e.g. push-button
13/16 . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot
13/18 . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift
13/26 . . Snap-action arrangements depending upon deformation of elastic members
13/50 . having a single operating member
13/52 . . the contact returning to its original state immediately upon removal of operating force, e.g. bell push switch
13/68 . having two operating members, one for opening and one for closing the same set of contacts (single operating member protruding from different sides of switch casing for alternate pushing upon opposite ends H01H 15/00)
13/70 . having a plurality of operating members associated with different sets of contacts, e.g. keyboard (mounting together a plurality of independent switches H02B)

15/00 **Switches having rectilinearly-movable operating part or parts adapted for actuation in opposite directions, e.g. slide switch**

17/00 **Switches having flexible operating part adapted only for pulling, e.g. cord, chain**

19/00 **Switches operated by an operating part which is rotatable about a longitudinal axis thereof and which is acted upon directly by a solid body external to the switch, e.g. by a hand [1,8]**

21/00 **Switches operated by an operating part in the form of a pivotable member acted upon directly by a solid body, e.g. by a hand** (tumbler or rocker switches H01H 23/00; switches having an operating part movable angularly in more than one plane H01H 25/04) **[1,8]**

23/00 Tumbler or rocker switches, i.e. switches characterised by being operated by rocking an operating member in the form of a rocker button

Note

In this group, the term "rocking" is defined as pivotal motion in one plane about an axis parallel to the switch faceplate and located substantially centrally between the ends of the rocker button. **[8]**

25/00 Switches with compound movement of handle or other operating part

25/04 . Operating part movable angularly in more than one plane, e.g. joystick

27/00 Switches operated by a removable member, e.g. key, plug or plate; **Switches operated by setting members according to a single predetermined combination out of several possible settings** (combined with plug-and-socket connectors H01R 13/70; with current-carrying plug H01R 31/00)

29/00 Switches having at least one liquid contact (solid contacts wetted or soaked with mercury H01H 1/06)

31/00 Air-break switches for high tension without arc-extinguishing or arc-preventing means (in combination with high tension or heavy-current switches with arc-extinguishing or arc-preventing means H01H 33/00) **[3]**

33/00 High-tension or heavy-current switches with arc-extinguishing or arc-preventing means

33/02 . Details

33/04 . . Means for extinguishing or preventing arc between current-carrying parts

33/28 . . Power arrangements internal to the switch for operating the driving mechanism

33/42 . . Driving mechanisms

33/59 . . Circuit arrangements not adapted to a particular application of the switch and not otherwise provided for, e.g. for ensuring operation of the switch at a predetermined point in the ac cycle

33/60 . Switches wherein the means for extinguishing or preventing the arc do not include separate means for obtaining or increasing flow of arc-extinguishing fluid

33/66 . . Vacuum switches

33/70 . Switches with separate means for directing, obtaining, or increasing flow of arc-extinguishing fluid

33/88 . . the flow of arc-extinguishing fluid being produced or increased by movement of pistons or other pressure-producing parts

35/00 Switches operated by change of a physical condition (operated by change of magnetic or electric field H01H 36/00; thermally-actuated switches H01H 37/00)

Note

A switching device is classified according to that physical condition which when changed acts as input to the device, e.g. external explosion causing pressure wave to act upon switch is classified in group H01H 35/24, an explosion produced within the switch in group H01H 37/00 if initiated by heat, in group H01H 39/00 if initiated electrically, and in group H01H 35/14 if initiated by an external blow.

35/02 . Switches operated by change of position, inclination, or orientation of the switch itself in relation to gravitational field (tilting mercury container H01H 29/00; change of position due to change of liquid level H01H 35/18)

35/06 . Switches operated by change of speed (operated by change of fluid flow H01H 35/24)

35/14 . Switches operated by change of acceleration, e.g. by shock or vibration, inertia switch

35/18 . Switches operated by change of liquid level or of liquid density, e.g. float switch (by magnet carried on a float H01H 36/00)

35/24 . Switches operated by change of fluid pressure, by fluid pressure waves, or by change of fluid flow (wherein the change of pressure is caused by change of temperature H01H 37/00)

35/42 . Switches operated by change of humidity

36/00 Switches actuated by change of magnetic field or of electric field, e.g. by change of relative position of magnet and switch, by shielding

37/00 Thermally-actuated switches

39/00 Switching devices actuated by an explosion produced within the device and initiated by an electric current

41/00 Switches providing a selected number of consecutive operations of the contacts by a single manual actuation of the operating part

43/00 Time or time-programme switches providing a choice of time-intervals for executing one or more switching actions and automatically terminating their operation after the programme is completed

Relays

45/00 Details of relays (electric circuit arrangements H01H 47/00; of electromagnetic relays H01H 50/00; details of electrically-operated selector switches H01H 63/00)

47/00 Circuit arrangements not adapted to a particular application of the relay and designed to obtain desired operating characteristics or to provide energising current

47/22 . for supplying energising current for relay coil

49/00 Apparatus or processes specially adapted to the manufacture of relays or parts thereof

50/00 Details of electromagnetic relays (electric circuit arrangements H01H 47/00; details of electrically-operated selector switches H01H 63/00)

50/02 . Bases; Casings; Covers (frames for mounting two or more relays or for mounting a relay and another electric component H02B 1/00, H04Q 1/02, H05K)

50/16 . Magnetic circuit arrangements

50/54 . Contact arrangements

51/00 **Electromagnetic relays** (relays using the dynamo-electric effect H01H 53/00)

51/22 . Polarised relays

53/00 **Relays using the dynamo-electric effect, i.e. relays in which contacts are opened or closed due to relative movement of current-carrying conductor and magnetic field caused by force of interaction between them**

55/00 **Magnetostrictive relays**

57/00 **Electrostrictive relays**; **Piezo-electric relays**

59/00 **Electrostatic relays**; **Electro-adhesion relays**

61/00 **Electrothermal relays** (thermal switches not operated by electrical input, thermal switches with anticipating electrical input H01H 37/00; thermally-sensitive members H01H 37/00)

Selectors **[3]**

63/00 **Details of electrically-operated selector switches**

65/00 **Apparatus or processes specially adapted to the manufacture of selector switches or parts thereof**

67/00 **Electrically-operated selector switches**

Emergency protective devices

69/00 **Apparatus or processes for the manufacture of emergency protective devices**

71/00 **Details of the protective switches or relays covered by groups H01H 73/00 to H01H 83/00**

71/02 . Housings; Casings; Bases; Mountings

71/04 . Means for indicating condition of the switching device

71/06 . Distinguishing marks, e.g. colour coding

71/08 . Terminals; Connections

71/10 . Operating or release mechanisms

71/12 . . Automatic release mechanisms with or without manual release

73/00 **Protective overload circuit-breaking switches in which excess current opens the contacts by automatic release of mechanical energy stored by previous operation of a hand reset mechanism**

75/00 **Protective overload circuit-breaking switches in which excess current opens the contacts by automatic release of mechanical energy stored by previous operation of power reset mechanism**

77/00 **Protective overload circuit-breaking switches operated by excess current and requiring separate action for resetting** (H01H 73/00, H01H 75/00 take precedence)

79/00 **Protective switches in which excess current causes the closing of contacts, e.g. for short-circuiting the apparatus to be protected**

81/00 **Protective switches in which contacts are normally closed but are repeatedly opened and reclosed as long as a condition causing excess current persists, e.g. for current limiting**

83/00 **Protective switches, e.g. circuit-breaking switches, or protective relays operated by abnormal electrical conditions otherwise than solely by excess current**

85/00 **Protective devices in which the current flows through a part of fusible material and this current is interrupted by displacement of the fusible material when this current becomes excessive** (switches actuated by melting of fusible material H01H 37/00; disposition or arrangement of fuses on boards H02B 1/00)

87/00 **Protective devices in which a current flowing through a liquid or solid is interrupted by the evaporation of the liquid or by the melting and evaporation of the solid when the current becomes excessive, the circuit continuity being reestablished on cooling [3]**

89/00 **Combinations of two or more different basic types of electric switches, relays, selectors and emergency protective devices, not covered by any single one of the other main groups of this subclass [8]**

89/02 . Combination of a key operated switch with a manually operated switch, e.g. ignition and lighting switches **[8]**

89/04 . Combination of a thermally actuated switch with a manually operated switch **[8]**

89/06 . Combination of a manual reset circuit with a contactor, i.e. the same circuit controlled by both a protective and a remote control device **[8]**

H01J **ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS** (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)

Notes

(1) This subclass covers only devices for producing, influencing, or using a flow of electrons or ions, e.g. for controlling, indicating, or switching of electric current, counting electric pulses, producing light or other electromagnetic oscillations, such as X-rays, or for separating or analysing radiation or particles, and having a closed or substantially closed casing containing a chosen gas, vapour, or vacuum, upon the pressure and nature of which the characteristics of the device depend.
Light sources using a combination (other than covered by group H01J 61/00 of this subclass) of discharge and other kinds of light generation are covered by group H05B 35/00.

(2) In this subclass, groups H01J 1/00 to H01J 7/00 relate only to:
(i) details of an unspecified kind of discharge tube or lamp, or
(ii) details mentioned in a specification as applicable to two or more kinds of tubes or lamps as defined by groups H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00 or H01J 65/00, hereinafter called basic kinds. A detail only described with reference to, or clearly only applicable to, tubes or lamps of a single basic kind is classified in the detail group appropriate to tubes or lamps of that basic kind, e.g. H01J 17/04.

(3) In this subclass, the following term is used with the meaning indicated:
– "lamp" includes tubes emitting ultra-violet or infra-red light.

(4) Attention is drawn to the definition of the expression "spark gaps" given in the Note following the title of subclass H01T. **[4]**

(5) Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof are classified in group H01J 9/00.

Subclass Index

1/00 **Details of electrodes, of magnetic control means, of screens, or of the mounting or spacing thereof, common to two or more basic types of discharge tubes or lamps** (details of electron-optical arrangements or of ion traps H01J 3/00)

1/02 . Main electrodes

1/13 . . Solid thermionic cathodes

1/20 . . . Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment

1/30 . . Cold cathodes

3/00 **Details of electron-optical or ion-optical arrangements or of ion traps common to two or more basic types of discharge tubes or lamps**

5/00 **Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps**

5/02 . Vessels; Containers; Shields associated therewith; Vacuum locks

7/00 **Details not provided for in groups H01J 1/00 to H01J 5/00 and common to two or more basic types of discharge tubes or lamps**

9/00 **Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof** (manufacture of vessels or containers from metal B21, e.g. B21D 51/00, from glass C03B); **Recovery of material from discharge tubes or lamps [1,7]**

9/02 . Manufacture of electrodes or electrode systems

9/04 . . of thermionic cathodes

9/08 . . Manufacture of heaters for indirectly-heated cathodes

9/12 . . of photo-emissive cathodes; of secondary-emission electrodes

9/14 . . of non-emitting electrodes

9/16 . . . Machines for making wire grids

9/18 . . Assembling together the component parts of electrode systems

9/20 . Manufacture of screens on or from which an image or pattern is formed, picked-up, converted or stored; Applying coatings to the vessel

9/22 . . Applying luminescent coatings

9/227 . . . with luminescent material discontinuously arranged, e.g. in dots or lines **[2]**

9/24 . Manufacture or joining of vessels, leading-in conductors, or bases

9/26 . . Sealing together parts of vessels

9/32 . . Sealing leading-in conductors

9/34 . . Joining base to vessel

9/38 . Exhausting, degassing, filling, or cleaning vessels

9/42 . Measurement or testing during manufacture

9/44 . Factory adjustment of completed discharge tubes or lamps to comply with desired tolerances

11/00 **Gas-filled discharge tubes without any main electrode inside the vessel**; **Gas-filled discharge tubes with at least one main electrode outside the vessel** (lamps H01J 65/00)

11/02 . Details, e.g. gas filling, shape of vessel

11/04 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

13/00 **Discharge tubes with liquid-pool cathodes, e.g. metal-vapour rectifying tubes** (lamps H01J 61/00)

15/00 **Gas-filled discharge tubes with gaseous cathodes, e.g. plasma cathode** (lamps H01J 61/00)

17/00 **Gas-filled discharge tubes with solid cathode** (H01J 25/00, H01J 27/00, H01J 31/00 to H01J 41/00 take precedence; gas or vapour discharge lamps H01J 61/00; gas filled spark gaps H01T; Marx converters H02M 7/04; tubes for generating potential differences by charges carried in a gas stream H02N)

17/02 . Details

17/04 . . Electrodes; Screens

17/38 . Cold-cathode tubes (TR boxes H01J 17/64)

17/48 . . with more than one cathode or anode, e.g. sequence-discharge tube, counting tube, dekatron

17/49 . . . Display panels, e.g. with crossed electrodes (gas-discharge-type indicating arrangements effected by the combination of a number of individual lamps G09F 9/313) **[3]**

17/50 . Thermionic-cathode tubes (TR boxes H01J 17/64)

17/64 . Tubes specially designed for switching or modulating in a waveguide, e.g. TR box

19/00 **Details of vacuum tubes of the types covered by group H01J 21/00**

21/00 **Vacuum tubes** (H01J 25/00, H01J 31/00 to H01J 40/00, H01J 43/00, H01J 47/00, H01J 49/00 take precedence; details of vacuum tubes H01J 19/00; cathode-ray or electron-stream lamps H01J 63/00)

23/00 **Details of transit-time tubes of the types covered by group H01J 25/00**

23/02 . Electrodes; Magnetic control means; Screens (associated with resonator or delay system H01J 23/16)

23/16 . Circuit elements, having distributed capacitance and inductance, structurally associated with the tube and interacting with the discharge (circuit elements, having distributed capacitance and inductance, in general H01P)

25/00 **Transit-time tubes, e.g. klystrons, travelling-wave tubes, magnetrons** (details of transit-time tubes H01J 23/00; particle accelerators H05H)

27/00 **Ion beam tubes** (H01J 25/00, H01J 33/00, H01J 37/00 take precedence; particle accelerators H05H)

27/02 . Ion sources; Ion guns (arrangements for handling particles, e.g. focusing, G21K 1/00; generating ions to be introduced into non-enclosed gases H01T 23/00; generating plasma H05H 1/24) **[3]**

27/16 . . using high-frequency excitation, e.g. microwave excitation **[3]**

29/00 **Details of cathode-ray tubes or of electron-beam tubes of the types covered by group H01J 31/00**

29/02 . Electrodes; Screens; Mounting, supporting, spacing, or insulating thereof

29/04 . . Cathodes (electron guns H01J 29/48)

29/06 . . Screens for shielding; Masks interposed in the electron stream

29/07 . . . Shadow masks for colour-television tubes **[2]**

29/10 . . Screens on, or from, which an image or pattern is formed, picked-up, converted, or stored

29/18 . . . Luminescent screens

29/20 . . . . characterised by the luminescent material

29/46 . Arrangements of electrodes and associated parts for generating or controlling the ray or beam, e.g. electron-optical arrangement

29/48 . . Electron guns

29/50 . . . two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 29/51 takes precedence) **[2]**

29/51 . . . Arrangements for controlling convergence of a plurality of beams **[2]**

Note

Group H01J 29/48 takes precedence over groups H01J 29/52 to H01J 29/58.

29/52 . . Arrangements for controlling intensity of ray or beam, e.g. for modulation

29/54 . . Arrangements for centring ray or beam

29/56 . . Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses

29/58 . . Arrangements for focusing or reflecting ray or beam

29/70 . . Arrangements for deflecting ray or beam (circuit arrangements for producing sawtooth pulses or other deflecting voltages or currents H03K)

29/72 . . . along one straight line or along two perpendicular straight lines

29/76 . . . . Deflecting by magnetic fields only

29/82 . . Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements

29/86 . Vessels; Containers; Vacuum locks

29/87 . . Arrangements for preventing or mitigating effects of implosion of vessels or containers **[2]**

29/88 . . provided with coatings on the walls thereof; Selection of materials for the coatings (luminescent screens H01J 29/18)

29/89 . . Optical or photographic arrangements structurally combined with the vessel

31/00 **Cathode-ray tubes**; **Electron-beam tubes** (H01J 25/00, H01J 33/00, H01J 35/00, H01J 37/00 take precedence; details of cathode-ray tubes or of electron-beam tubes H01J 29/00; cathode-ray or electron-stream lamps H01J 63/00)

31/08 . having a screen on or from which an image or pattern is formed, picked-up, converted, or stored

31/10 . . Image or pattern display tubes, i.e. having electrical input and optical output; Flying-spot tubes for scanning purposes

31/12 . . . with luminescent screen

31/14 . . . . Magic-eye or analogous tuning indicators

31/15 . . . . with ray or beam selectively directed to luminescent anode segments **[3]**

31/16 . . . . with mask carrying a number of selectively displayable signs, e.g. numeroscope

31/18 . . . . with image written by a ray or beam on a grid-like charge-accumulating screen, and with a ray or beam passing through, and influenced by, this screen before striking the luminescent screen, e.g. direct-view storage tube

33/00 **Discharge tubes with provision for emergence of electrons or ions from the vessel** (particle accelerators H05H); **Lenard tubes**

35/00 **X-ray tubes** (X-ray lasers H01S 4/00; X-ray technique in general H05G)

37/00 **Discharge tubes with provision for introducing objects or material to be exposed to the discharge, e.g. for the purpose of examination or processing thereof** (H01J 33/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00 take precedence; investigating or analysing surface structures in atomic ranges using scanning-probe techniques G01N 13/10; contactless testing of electronic circuits using electron beams G01R 31/28; details of scanning-probe apparatus, in general G12B 21/00) **[2,5]**

37/02 . Details

37/04 . . Arrangements of electrodes and associated parts for generating or controlling the discharge, e.g. electron-optical arrangement, ion-optical arrangement

37/06 . . . Electron sources; Electron guns

37/08 . . . Ion sources; Ion guns

37/09 . . . Diaphragms; Shields associated with electron- or ion-optical arrangements; Compensation of disturbing fields **[3]**

37/10 . . . Lenses

37/147 . . . Arrangements for directing or deflecting the discharge along a desired path (lenses H01J 37/10) **[2]**

37/20 . . Means for supporting or positioning the object or the material; Means for adjusting diaphragms or lenses associated with the support (preparing specimens for investigation G01N 1/28)

37/22 . . Optical or photographic arrangements associated with the tube

37/244 . . Detectors; Associated components or circuits therefor **[3]**

37/252 . Tubes for spot-analysing by electron or ion beams; Microanalysers (investigating or analysing thereby G01N 23/22) **[3]**

37/26 . Electron or ion microscopes; Electron- or ion-diffraction tubes **[2]**

37/28 . . with scanning beams (microanalysers using scanning beams H01J 37/252)

37/30 . Electron-beam or ion-beam tubes for localised treatment of objects

37/305 . . for casting, melting, evaporating, or etching **[2]**

37/31 . . for cutting or drilling **[2]**

37/315 . . for welding **[2]**

37/317 . . for changing properties of the objects or for applying thin layers thereon, e.g. ion implantation (H01J 37/32 takes precedence) **[3]**

37/32 . Gas-filled discharge tubes (heating by discharge H05B)

40/00 **Photoelectric discharge tubes not involving the ionisation of a gas** (H01J 49/00 takes precedence; cathode-ray or image-pick-up tubes H01J 31/08; operating with secondary emission H01J 43/00) **[3]**

41/00 **Discharge tubes and means integral therewith for measuring gas pressure** (vacuum gauge systems using such tubes G01L 21/00); **Discharge tubes for evacuation by diffusion of ions**

43/00 **Secondary-emission tubes**; **Electron-multiplier tubes** (dynamic electron-multiplier tubes H01J 25/00; secondary-emission detectors for measurement of nuclear or X-radiation G01T 1/00)

45/00 **Discharge tubes functioning as thermionic generators**

47/00 **Tubes for determining the presence, intensity, density or energy of radiation or particles** (photoelectric discharge tubes not involving the ionisation of a gas H01J 40/00) **[3]**

49/00 **Particle spectrometers or separator tubes** (for measuring gas pressure H01J 41/00) **[3]**

Note

In classifying particle separators, no distinction is made between spectrometry and spectrography, the difference being only in the manner of detection which in the first case is electrical and in the second case is by means of a photographic film. **[3]**

49/02 . Details **[3]**

49/10 . . Ion sources; Ion guns **[3]**

49/26 . Mass spectrometers or separator tubes (isotope separation using these tubes B01D 59/00; mass spectrometers specially adapted for column chromatography G01N 30/00) **[3]**

49/34 . . Dynamic spectrometers **[3]**

Discharge lamps

61/00 **Gas- or vapour-discharge lamps** (use for sterilising milk products A23C; use for medical purposes A61N 5/00; use for disinfecting water C02F; use for lighting F21; circuits therefor H05B; arc lamps with consumable electrodes H05B; electroluminescent lamps H05B)

61/02 . Details

61/04 . . Electrodes (for igniting H01J 61/54); Screens; Shields

61/06 . . . Main electrodes

61/067 . . . . for low-pressure discharge lamps **[2]**

61/12 . . Selection of substances for gas fillings; Specified operating pressure or temperature

61/24 . . Means for obtaining or maintaining the desired pressure within the vessel

61/30 . . Vessels; Containers

61/32 . . . Special longitudinal shape, e.g. for advertising purposes

61/33 . . . Special shape of cross-section, e.g. for producing cool spot

61/34 . . . Double-wall vessels or containers

61/35 . . . provided with coatings on the walls thereof; Selection of materials for the coatings (using coloured coatings H01J 61/38; using luminescent coatings H01J 61/38)

61/36 . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors

61/38 . . Devices for influencing the colour or wavelength of the light

61/54 . . Igniting arrangements, e.g. promoting ionisation for starting (circuit arrangements H05B)

61/84 . Lamps with discharge constricted by high pressure

63/00 **Cathode-ray or electron-stream lamps** (flying-spot tubes H01J 31/10; magic-eye tuning indicators H01J 31/14; lamps with incandescent body heated by the ray or stream H01K)

65/00 **Lamps without any electrode inside the vessel**; **Lamps with at least one main electrode outside the vessel**

65/04 . Lamps in which a gas filling is excited to luminesce by an external electromagnetic field or by external corpuscular radiation, e.g. for indicating

99/00 **Subject matter not provided for in other groups of this subclass [8]**

H01K **ELECTRIC INCANDESCENT LAMPS** (details or apparatus or processes for manufacture applicable to both discharge devices and incandescent lamps H01J; light sources using a combination of incandescent and other types of light generation H01J 61/00, H05B 35/00; circuits therefor H05B)

Note

In this subclass, the following term is used with the meaning indicated:
– "lamp" includes tubes emitting ultra-violet or infra-red light.

Subclass Index

1/00 **Details**

1/28 . Envelopes; Vessels

1/42 . Means forming part of the lamp for the purpose of providing electrical connection to, or support for, the lamp (electric coupling devices comprising a holder adapted for supporting a lamp and not forming part of the lamp H01R 33/00)

3/00 **Apparatus or processes adapted to the manufacture, installing, removal, or maintenance of incandescent lamps or parts thereof** (manufacture of vessels from glass C03B)

5/00 **Lamps for general lighting** (H01K 9/00 to H01K 13/00 take precedence)

7/00 **Lamps for purposes other than general lighting** (H01K 9/00 to H01K 13/00 take precedence)

9/00 **Lamps having two or more incandescent bodies separately heated** (H01K 11/00, H01K 13/00 take precedence; incandescent-filament-type indicating arrangements affected by the combination of a number of individual lamps G09F 9/307)

11/00 **Lamps having an incandescent body which is not conductively heated, e.g. heated inductively, heated by electronic discharge** (H01K 13/00 takes precedence; heated by light-emitting discharge H01J 61/00)

13/00 **Lamps having an incandescent body which is substantially non-conductive until heated, e.g. Nernst lamp**

H01L **SEMICONDUCTOR DEVICES**; **ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR** (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resistors in general H01C; magnets, inductors, transformers H01F; capacitors in general H01G; electrolytic devices H01G 9/00; batteries, accumulators H01M; waveguides, resonators, or lines of the waveguide type H01P; line connectors, current collectors H01R; stimulated-emission devices H01S; electromechanical resonators H03H; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R; electric light sources in general H05B; printed circuits, hybrid circuits, casings or constructional details of electrical apparatus, manufacture of assemblages of electrical components H05K; use of semiconductor devices in circuits having a particular application, see the subclass for the application) **[2]**

Notes

(1) This subclass covers:
– electric solid state devices which are not covered by any other subclass and details thereof, and includes: semiconductor devices adapted for rectifying, amplifying, oscillating or switching; semiconductor devices sensitive to radiation; electric solid state devices using thermoelectric, superconductive, piezo-electric, electrostrictive, magnetostrictive, galvano-magnetic or bulk negative resistance effects and integrated circuit devices; **[2]**
– photoresistors, magnetic field dependent resistors, field effect resistors, capacitors with potential-jump barrier, resistors with potential-jump barrier or surface barrier, incoherent light emitting diodes and thin-film or thick-film circuits; **[2]**
– processes and apparatus adapted for the manufacture or treatment of such devices, except where such processes relate to single-step processes for which provision exists elsewhere. **[2]**

(2) In this subclass, the following terms or expressions are used with the meaning indicated:
- "wafer" means a slice of semiconductor or crystalline substrate material, which can be modified by impurity diffusion (doping), ion implantation or epitaxy, and whose active surface can be processed into arrays of discrete components or integrated circuits; **[8]**
- "solid state body" means the body of material within which, or at the surface of which, the physical effects characteristic of the device occur. In thermoelectric devices, it includes all materials in the current path.

Regions in or on the body of the device (other than the solid state body itself), which exert an influence on the solid state body electrically, are considered to be "electrodes" whether or not an external electrical connection is made thereto. An electrode may include several portions and the term includes metallic regions which exert influence on the solid state body through an insulating region (e.g. capacitive coupling) and inductive coupling arrangements to the body. The dielectric region in a capacitive arrangement is regarded as part of the electrode. In arrangements including several portions, only those portions which exert an influence on the solid state body by virtue of their shape, size, or disposition or the material of which they are formed are considered to be part of the electrode. The other portions are considered to be "arrangements for conducting electric current to or from the solid state body" or "interconnections between solid state components formed in or on a common substrate", i.e. leads; **[2]**

- "device" means an electric circuit element; where an electric circuit element is one of a plurality of elements formed in or on a common substrate it is referred to as a "component"; **[2]**
- "complete device" is a device in its fully assembled state which may or may not require further treatment, e.g. electroforming, before it is ready for use but which does not require the addition of further structural units; **[2]**
- "parts" includes all structural units which are included in a complete device; **[2]**
- "container" is an enclosure forming part of the complete device and is essentially a solid construction in which the body of the device is placed, or which is formed around the body without forming an intimate layer thereon. An enclosure which consists of one or more layers formed on the body and in intimate contact therewith is referred to as an "encapsulation"; **[2]**
- "integrated circuit" is a device where all components, e.g. diodes, resistors, are built up on a common substrate and form the device including interconnections between the components; **[2]**
- "assembly" of a device is the building up of the device from its component constructional units and includes the provision of fillings in containers. **[2]**

(3) In this subclass, both the process or apparatus for the manufacture or treatment of a device and the device itself are classified, whenever both of these are described sufficiently to be of interest. **[6]**

Subclass Index

21/00 Processes or apparatus specially adapted for the manufacture or treatment of semiconductor or solid state devices or of parts thereof [2,8]

Note

Group H01L 21/70 takes precedence over groups H01L 21/02 to H01L 21/67. **[2]**

21/02 . Manufacture or treatment of semiconductor devices or of parts thereof **[2,8]**

21/64 . Manufacture or treatment of solid state devices other than semiconductor devices, or of parts thereof, not specially adapted for a single type of device provided for in groups H01L 31/00 to H01L 51/00 **[2,8]**

21/66 . Testing or measuring during manufacture or treatment **[2]**

21/67 . Apparatus specially adapted for handling semiconductor or electric solid state devices during manufacture or treatment thereof; Apparatus specially adapted for handling wafers during manufacture or treatment of semiconductor or electric solid state devices or components **[8]**

21/70 . Manufacture or treatment of devices consisting of a plurality of solid state components or integrated circuits formed in or on a common substrate or of specific parts thereof; Manufacture of integrated circuit devices or of specific parts thereof (manufacture of assemblies consisting of preformed electrical components H05K 3/00, H05K 13/00) **[2]**

23/00 Details of semiconductor or other solid state devices (H01L 25/00 takes precedence) **[2,5]**

Note

This group does not cover:
- details of semiconductor bodies or of electrodes of devices provided for in group H01L 29/00, which details are covered by that group;
- details peculiar to devices provided for in a single main group of groups H01L 31/00 to H01L 51/00, which details are covered by those groups.

23/02 . Containers; Seals (H01L 23/12, H01L 23/34, H01L 23/48, H01L 23/552 take precedence) **[2,5]**

23/12 . Mountings, e.g. non-detachable insulating substrates **[2]**

23/16 . Fillings or auxiliary members in containers, e.g. centering rings (H01L 23/34, H01L 23/552 take precedence) **[2,5]**

23/28 . Encapsulation, e.g. encapsulating layers, coatings (H01L 23/552 takes precedence) **[2,5]**

23/32 . Holders for supporting the complete device in operation, i.e. detachable fixtures (H01L 23/34 takes precedence) **[2,5]**

23/34 . Arrangements for cooling, heating, ventilating or temperature compensation **[2,5]**

23/48 . Arrangements for conducting electric current to or from the solid state body in operation, e.g. leads or terminal arrangements **[2]**

23/52 . Arrangements for conducting electric current within the device in operation from one component to another **[2]**

23/544 . Marks applied to semiconductor devices, e.g. registration marks, test patterns **[5]**

23/552 . Protection against radiation, e.g. light **[5]**

23/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for **[5]**

25/00 Assemblies consisting of a plurality of individual semiconductor or other solid state devices (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00; assemblies of photoelectronic cells H01L 31/042) **[2,5]**

25/03 . all the devices being of a type provided for in the same subgroup of groups H01L 27/00 to H01L 51/00, e.g. assemblies of rectifier diodes **[5,8]**

25/04 . . the devices not having separate containers **[2]**

25/065 . . . the devices being of a type provided for in group H01L 27/00 **[5]**

25/07 . . . the devices being of a type provided for in group H01L 29/00 **[5]**

25/075 . . . the devices being of a type provided for in group H01L 33/00 **[5]**

25/10 . . the devices having separate containers **[2]**

25/16 . the devices being of types provided for in two or more different main groups of groups H01L 27/00 to H01L 51/00, e.g. forming hybrid circuits **[2,8]**

25/18 . the devices being of types provided for in two or more different subgroups of the same main group of groups H01L 27/00 to H01L 51/00 **[5,8]**

27/00 Devices consisting of a plurality of semiconductor or other solid-state components formed in or on a common substrate (details thereof H01L 23/00, H01L 29/00 to H01L 51/00; assemblies consisting of a plurality of individual solid state devices H01L 25/00) **[2,8]**

Note

In groups H01L 27/01 to H01L 27/28, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[2]**

27/01 . comprising only passive thin-film or thick-film elements formed on a common insulating substrate **[3]**

27/02 . including semiconductor components specially adapted for rectifying, oscillating, amplifying or switching and having at least one potential-jump barrier or surface barrier; including integrated passive circuit elements with at least one potential-jump barrier or surface barrier **[2]**

27/04 . . the substrate being a semiconductor body **[2]**

27/06 . . . including a plurality of individual components in a non-repetitive configuration **[2]**

27/07 . . . . the components having an active region in common **[5]**

27/08 . . . including only semiconductor components of a single kind **[2]**

27/082 . . . . including bipolar components only **[5]**

27/085 . . . . including field-effect components only **[5]**

27/10 . . . including a plurality of individual components in a repetitive configuration **[2]**

27/102 . . . . including bipolar components **[5]**

27/105 . . . . including field-effect components **[5]**

27/108 . . . . . Dynamic random access memory structures **[5]**

27/11 . . . . . Static random access memory structures **[5]**

27/112 . . . . . Read-only memory structures **[5]**

27/115 . . . . . Electrically programmable read-only memories **[5]**

27/118 . . . . Masterslice integrated circuits **[5]**

27/12 . . the substrate being other than a semiconductor body, e.g. an insulating body **[2]**

27/13 . . . combined with thin-film or thick-film passive components **[3]**

27/14 . including semiconductor components sensitive to infra-red radiation, light, electromagnetic radiation of shorter wavelength or corpuscular radiation and specially adapted either for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation (radiation-sensitive components structurally associated with one or more electric light sources only H01L 31/14; couplings of light guides with optoelectronic elements G02B 6/42) **[2]**

27/142 . . Energy conversion devices **[5]**

27/144 . . Devices controlled by radiation **[5]**

27/146 . . . Imager structures **[5]**

27/148 . . . . Charge coupled imagers **[5]**

27/15 . including semiconductor components with at least one potential-jump barrier or surface barrier, specially adapted for light emission **[2]**

27/16 . including thermoelectric components with or without a junction of dissimilar materials; including thermomagnetic components (using the Peltier effect only for cooling of semiconductor or other solid state devices H01L 23/34) **[2]**

27/18 . including components exhibiting superconductivity **[2]**

27/20 . including piezo-electric components; including electrostrictive components; including magnetostrictive components **[2,7]**

27/22 . including components using galvano-magnetic effects, e.g. Hall effect; using similar magnetic field effects **[2]**

27/24 . including solid state components for rectifying, amplifying, or switching without a potential-jump barrier or surface barrier **[2]**

27/26 . including bulk negative resistance effect components **[2]**

27/28 . including components using organic materials as the active part, or using a combination of organic materials with other materials as the active part **[8]**

29/00 Semiconductor devices specially adapted for rectifying, amplifying, oscillating or switching and having at least one potential-jump barrier or surface barrier; **Capacitors or resistors with at least one potential-jump barrier or surface barrier, e.g. PN-junction depletion layer or carrier concentration layer**; **Details of semiconductor bodies or of electrodes thereof** (H01L 31/00 to H01L 47/00, H01L 51/05 take precedence; details other than of semiconductor bodies or of electrodes thereof H01L 23/00; devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2,6]**

Note

In this main group, classification is made in all of groups H01L 29/02, H01L 29/40 and H01L 29/66 if all of these groups are relevant. **[2]**

29/02 . Semiconductor bodies **[2]**

29/40 . Electrodes **[2]**

29/66 . Types of semiconductor device **[2]**

31/00 Semiconductor devices sensitive to infra-red radiation, light, electromagnetic radiation of shorter wavelength, or corpuscular radiation and specially adapted either for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof**; **Details thereof** (H01L 51/42 takes precedence; devices consisting of a plurality of solid state components formed in, or on, a common substrate, other than combinations of radiation-sensitive components with one or more electric light sources, H01L 27/00) **[2,6,8]**

31/02 . Details **[2]**

31/0203 . . Containers; Encapsulations **[5]**

31/0216 . . Coatings **[5]**

31/0224 . . Electrodes **[5]**

31/0232 . . Optical elements or arrangements associated with the device **[5]**

31/0236 . . Special surface textures **[5]**

31/024 . . Arrangements for cooling, heating, ventilating or temperature compensation **[5]**

31/0248 . characterised by their semiconductor bodies **[5]**

31/0256 . . characterised by the material **[5]**

31/0264 . . . Inorganic materials **[5]**

31/036 . . characterised by their crystalline structure or particular orientation of the crystalline planes **[5]**

31/04 . adapted as conversion devices **[2]**

31/042 . . including a panel or array of photoelectric cells, e.g. solar cells **[5]**

31/045 . . . collapsible or foldable **[5]**

31/048 . . . encapsulated or with housing **[5]**

31/05 . . . characterised by special interconnection means **[5]**

31/052 . . . with cooling, light-reflecting or light-concentrating means **[5]**

31/058 . . . including means to utilise heat energy, e.g. hybrid systems, or a supplementary source of electric energy **[5]**

31/06 . . characterised by at least one potential-jump barrier or surface barrier **[2]**

31/08 . in which radiation controls flow of current through the device, e.g. photoresistors **[2]**

31/10 . . characterised by at least one potential-jump barrier or surface barrier, e.g. phototransistors **[2]**

31/101 . . . Devices sensitive to infra-red, visible or ultra-violet radiation **[5]**

31/102 . . . . characterised by only one potential barrier or surface barrier **[5]**

31/115 . . . Devices sensitive to very short wavelength, e.g. X-rays, gamma-rays or corpuscular radiation **[5]**

31/12 . structurally associated with, e.g. formed in or on a common substrate with, one or more electric light sources, e.g. electroluminescent light sources, and electrically or optically coupled thereto (electroluminescent light sources per se H05B 33/00) **[2,5]**

31/14 . . the light source or sources being controlled by the semiconductor device sensitive to radiation, e.g. image converters, image amplifiers, image storage devices **[2]**

31/16 . . the semiconductor device sensitive to radiation being controlled by the light source or sources **[2]**

31/18 . Processes or apparatus specially adapted for the manufacture or treatment of these devices or of parts thereof **[2]**

33/00 Semiconductor devices with at least one potential-jump barrier or surface barrier specially adapted for light emission, e.g. infra-red; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof**; **Details thereof** (H01L 51/50 takes precedence; devices consisting of a plurality of components formed in or on a common substrate H01L 27/15; semiconductor lasers H01S 5/00) **[2,8]**

35/00 Thermoelectric devices comprising a junction of dissimilar materials, i.e. exhibiting Seebeck or Peltier effect with or without other thermoelectric effects or thermomagnetic effects; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof**; **Details thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

35/12 . Selection of the material for the legs of the junction **[2]**

35/28 . operating with Peltier or Seebeck effect only **[2]**

35/32 . . characterised by the structure or configuration of the cell or thermo-couple forming the device **[2]**

37/00 Thermoelectric devices without a junction of dissimilar materials; **Thermomagnetic devices, e.g. using Nernst-Ettinghausen effect**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

39/00 **Devices using superconductivity or hyperconductivity**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00; superconductors characterised by the ceramic-forming technique or the ceramic composition C04B 35/00; superconductive or hyperconductive conductors, cables, or transmission lines H01B 12/00; superconductive coils or windings H01F; amplifiers using superconductivity H03F 19/00) **[2,4]**

39/02 . Details **[2]**

39/04 . . Containers; Mountings **[2]**

39/12 . . characterised by the material **[2]**

39/14 . Permanent superconductor devices **[2]**

39/16 . Devices switchable between superconductive and normal states **[2]**

39/22 . Devices comprising a junction of dissimilar materials, e.g. Josephson-effect devices **[2]**

39/24 . Processes or apparatus specially adapted for the manufacture or treatment of devices provided for in group H01L 39/00 or of parts thereof **[2]**

41/00 **Piezo-electric elements in general**; **Electrostrictive elements in general**; **Magnetostrictive elements in general**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof**; **Details thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

Notes

(1) This group does not cover adaptations for particular purposes, which are covered by the relevant places. **[6]**

(2) Attention is drawn to the following such places: **[6]**

B06B		for adaptations for generating or transmitting mechanical vibrations
G01		for transducers as sensing elements for measuring
G04C, G04F		for transducers adapted for use in time-pieces
G10K		for adaptations for generating or transmitting sound
H02N		for arrangements of elements in electric machines
H03H	9/00	for networks comprising electro-mechanical or electro-acoustic elements, e.g. resonant circuits
H04R		for loudspeakers, microphones, gramophone pick-ups or like transducers.

41/08 . Piezo-electric or electrostrictive elements **[2]**

41/083 . . having a stacked or multilayer structure **[6]**

41/087 . . formed as coaxial cables **[6]**

Note

Groups H01L 41/083 and H01L 41/087 take precedence over groups H01L 41/09 to H01L 41/113. **[6]**

41/09 . . with electrical input and mechanical output **[5]**

41/107 . . with electrical input and electrical output **[5]**

41/113 . . with mechanical input and electrical output **[5]**

41/16 . Selection of materials **[2]**

41/18 . . for piezo-electric or electrostrictive elements **[2]**

41/22 . Processes or apparatus specially adapted for the manufacture or treatment of these elements or of parts thereof **[2]**

41/24 . . of elements of ceramic composition **[5]**

43/00 **Devices using galvano-magnetic or similar magnetic effects**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

43/06 . Hall-effect devices **[2]**

43/08 . Magnetic-field-controlled resistors **[2]**

45/00 **Solid state devices specially adapted for rectifying, amplifying, oscillating, or switching without a potential-jump barrier or surface barrier, e.g. dielectric triodes**; **Ovshinsky-effect devices**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00; devices using superconductivity or hyperconductivity H01L 39/00; piezo-electric elements H01L 41/00; bulk negative resistance effect devices H01L 47/00) **[2]**

47/00 **Bulk negative resistance effect devices, e.g. Gunn-effect devices**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

49/00 **Solid state devices not provided for in groups H01L 27/00 to H01L 47/00 and H01L 51/00 and not provided for in any other subclass**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof [2,8]**

49/02 . Thin-film or thick-film devices **[2]**

51/00 **Solid state devices using organic materials as the active part, or using a combination of organic materials with other materials as the active part**; **Processes or apparatus specially adapted for the manufacture or treatment of such devices, or of parts thereof** (devices consisting of a plurality of components formed in or on a common substrate H01L 27/28; thermoelectric devices using organic material H01L 35/00, H01L 37/00; piezo-electric, electrostrictive or magnetostrictive elements using organic material H01L 41/00) **[6,8]**

51/05 . specially adapted for rectifying, amplifying, oscillating or switching and having at least one potential-jump barrier or surface barrier; Capacitors or resistors with at least one potential-jump barrier or surface barrier **[8]**

51/42 . specially adapted for sensing infra-red radiation, light, electromagnetic radiation of shorter wavelength, or corpuscular radiation; specially adapted either for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation **[8]**

51/50 . specially adapted for light emission, e.g. organic light emitting diodes (OLED) or polymer light emitting devices (PLED) (organic semiconductor lasers H01S 5/00) **[8]**

H01M **PROCESSES OR MEANS, E.G. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY** (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical energy H01L, e.g. H01L 31/00, H01L 35/00, H01L 37/00) **[2]**

Notes

(1) This subclass covers galvanic primary or secondary cells or batteries, fuel cells or batteries.
(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass Index

2/00 **Constructional details, or processes of manufacture, of the non-active parts [2]**

2/02 . Cases, jackets, or wrappings (working of plastics or substances in a plastic state B29) **[2]**
2/04 . . Lids or covers **[2]**
2/06 . . Arrangements for introducing electric connectors into or through cases **[2]**
2/08 . . Sealing materials **[2]**
2/10 . Mountings; Suspension devices; Shock absorbers; Transport or carrying devices; Holders (structural combination of accumulators with charging apparatus H01M 10/42) **[2]**
2/12 . Vent plugs or other mechanical arrangements for facilitating escape of gases **[2]**
2/14 . Separators; Membranes; Diaphragms; Spacing elements **[2]**
2/16 . . characterised by the material **[2]**
2/20 . Current-conducting connections for cells **[2]**
2/22 . . Fixed connections, i.e. not intended for disconnection **[2]**
2/26 . . . Electrode connections **[2]**
2/30 . . Terminals **[2]**

4/00 **Electrodes** (electrodes for electrolytic processes C25) **[2]**

Note

In classifying electrodes of hybrid cells, the individual half-cells of the hybrid cell are considered separately, e.g. an electrode in the primary half of a primary/fuel type hybrid cell is considered to be a primary-cell electrode covered by H01M 4/06. **[2]**

4/02 . Electrodes composed of, or comprising, active material **[2]**
4/04 . . Processes of manufacture in general **[2]**
4/06 . . Electrodes for primary cells **[2]**
4/14 . . Electrodes for lead-acid accumulators **[2]**
4/16 . . . Processes of manufacture **[2]**
4/24 . . Electrodes for alkaline accumulators **[2]**
4/26 . . . Processes of manufacture **[2]**
4/28 . . . . Precipitating active material on the carrier **[2]**
4/30 . . . . Pressing **[2]**
4/32 . . . Nickel oxide or hydroxide electrodes **[2]**
4/34 . . . Silver oxide or hydroxide electrodes **[2]**
4/36 . . Selection of substances as active materials, active masses, active liquids **[2]**
4/38 . . . of elements or alloys **[2]**
4/40 . . . . Alloys based on alkali metals **[2]**
4/42 . . . . Alloys based on zinc **[2]**
4/44 . . . . Alloys based on cadmium **[2]**
4/46 . . . . Alloys based on magnesium or aluminium **[2]**
4/48 . . . of inorganic oxides or hydroxides **[2]**
4/50 . . . . of manganese **[2]**
4/52 . . . . of nickel, cobalt, or iron **[2]**
4/58 . . . of inorganic compounds other than oxides or hydroxides **[2]**
4/62 . . Selection of inactive substances as ingredients for active masses, e.g. binders, fillers **[2]**
4/64 . . Carriers or collectors **[2]**
4/66 . . . Selection of materials **[2]**
4/70 . . . characterised by shape or form **[2]**
4/72 . . . . Grids **[2]**
4/86 . Inert electrodes with catalytic activity, e.g. for fuel cells **[2]**
4/88 . . Processes of manufacture **[2]**
4/90 . . Selection of catalytic material **[2]**
4/94 . . Non-porous diffusion electrodes, e.g. palladium membranes, ion exchange membranes **[2]**
4/96 . . Carbon-based electrodes **[2]**
4/98 . . Raney-type electrodes **[2]**

6/00 **Primary cells**; **Manufacture thereof [2]**

Note

In this group, primary cells are electrochemical generators in which the cell energy is present in chemical form and is not regenerated. **[2]**

6/02 . Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2]**
6/04 . Cells with aqueous electrolyte **[2]**
6/14 . Cells with non-aqueous electrolyte **[2]**
6/16 . . with organic electrolyte (H01M 6/18 takes precedence) **[2]**
6/18 . . with solid electrolyte **[2]**
6/20 . . . working at high temperature (deferred-action thermal cells H01M 6/30) **[2]**
6/24 . Cells comprising two different electrolytes **[2]**
6/26 . Cells without oxidising active material, e.g. Volta cells **[2]**
6/28 . Standard cells, e.g. Weston cells **[2]**
6/30 . Deferred-action cells **[2]**
6/40 . Printed batteries **[2]**
6/42 . Grouping of primary cells into batteries (H01M 6/40 takes precedence) **[2]**

8/00 **Fuel cells**; **Manufacture thereof [2]**

Note

In this group, fuel cells are electrochemical generators wherein the reactants are supplied from outside. **[2]**

8/02 . Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2]**
8/04 . Auxiliary arrangements or processes, e.g. for control of pressure, for circulation of fluids **[2]**
8/06 . Combination of fuel cell with means for production of reactants or for treatment of residues (regenerative fuel cells H01M 8/18; production of reactants per se, see sections B or C) **[2]**
8/08 . Fuel cells with aqueous electrolytes **[2]**
8/10 . Fuel cells with solid electrolytes **[2]**
8/12 . . operating at high temperature, e.g. with stabilised ZrO_2 electrolyte **[2]**
8/14 . Fuel cells with fused electrolytes **[2]**
8/16 . Biochemical fuel cells, i.e. cells in which micro-organisms function as catalysts **[2]**
8/18 . Regenerative fuel cells **[2]**
8/20 . Indirect fuel cells, e.g. redox cells (H01M 8/18 takes precedence) **[2]**
8/22 . Fuel cells in which the fuel is based on materials comprising carbon or oxygen or hydrogen and other elements; Fuel cells in which the fuel is based on materials comprising only elements other than carbon, oxygen, or hydrogen **[2]**
8/24 . Grouping of fuel cells into batteries, e.g. modules **[2]**

10/00 **Secondary cells**; **Manufacture thereof [2]**

Note

In this group, secondary cells are accumulators receiving and supplying electrical energy by means of reversible electrochemical reactions. **[2]**

10/02 . Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2]**
10/04 . Construction or manufacture in general (H01M 10/06, H01M 10/24, H01M 10/36 take precedence) **[2]**
10/06 . Lead-acid accumulators (semi-lead accumulators H01M 10/20) **[2]**
10/20 . Semi-lead accumulators, i.e. accumulators in which only one electrode contains lead **[2]**
10/24 . Alkaline accumulators **[2]**
10/34 . Gastight accumulators **[2]**
10/36 . Accumulators not provided for in groups H01M 10/06 to H01M 10/34 **[2]**
10/42 . Methods or arrangements for servicing or maintenance of secondary cells or secondary half-cells **[2]**
10/54 . Reclaiming serviceable parts of waste accumulators **[2]**

12/00 **Hybrid cells**; **Manufacture thereof** (methods or arrangements for servicing or maintenance H01M 6/00, H01M 10/00) **[2]**

Note

In this group, hybrid cells are electrochemical generators having two different types of half-cells, the half-cell being an electrode-electrolyte combination of either a primary, a secondary, or a fuel cell. **[2]**

14/00 **Electrochemical current or voltage generators not provided for in groups H01M 6/00 to H01M 12/00**; **Manufacture thereof [2]**

16/00 **Structural combinations of different types of electrochemical generators [2]**

H01P **WAVEGUIDES**; **RESONATORS, LINES OR OTHER DEVICES OF THE WAVEGUIDE TYPE** (operating at optical frequencies G02B)

Note

In this subclass, the following expression is used with the meaning indicated:
– "waveguide type" as applied to transmission lines includes only high-frequency coaxial cables or Lecher lines, and as applied to resonators, delay lines, or other devices includes all devices having distributed inductance and capacitance.

Subclass Index

1/00 **Auxiliary devices** (coupling devices of the waveguide type H01P 5/00)
1/02 . Bends; Corners; Twists
1/04 . Fixed joints
1/06 . Movable joints, e.g. rotating joints
1/08 . Dielectric windows
1/10 . for switching or interrupting
1/16 . for mode selection, e.g. mode suppression or mode promotion; for mode conversion **[3]**
1/165 . for rotating the plane of polarisation **[2]**
1/18 . Phase-shifters (H01P 1/165 takes precedence) **[2]**
1/20 . Frequency-selective devices, e.g. filters
1/22 . Attenuating devices (dissipative terminating devices H01P 1/24)
1/24 . Terminating devices
1/30 . for compensation of, or protection against, temperature or moisture effects
1/32 . Non-reciprocal transmission devices (H01P 1/02 to H01P 1/30 take precedence) **[3]**

3/00 **Waveguides**; **Transmission lines of the waveguide type**
3/02 . with two longitudinal conductors
3/08 . . Microstrips; Strip lines

5/00 **Coupling devices of the waveguide type**
5/02 . with invariable factor of coupling (H01P 5/12 takes precedence) **[3]**
5/04 . with variable factor of coupling
5/08 . for linking lines or devices of different kinds (H01P 1/16, H01P 5/04 take precedence; linking lines of the same kind but with different dimensions H01P 5/02) **[3]**
5/10 . . for coupling balanced with unbalanced lines or devices
5/12 . Coupling devices having more than two ports (H01P 5/04 takes precedence) **[3]**
5/16 . . Conjugate devices, i.e. devices having at least one port decoupled from one other port **[2]**

7/00 **Resonators of the waveguide type**
7/04 . Coaxial resonators
7/08 . Strip line resonators **[3]**
7/10 . Dielectric resonators **[3]**

9/00 **Delay lines of the waveguide type**

11/00 **Apparatus or processes specially adapted for manufacturing waveguides or resonators, lines, or other devices of the waveguide type**

H01Q **AERIALS** (microwave radiators for near-field therapeutic treatment A61N 5/02; apparatus for testing aerials or for measuring aerial characteristics G01R; waveguides H01P; radiators or aerials for microwave heating H05B 6/72)

Notes

(1) This subclass covers:
– in addition to the primary active radiating elements,
(i) secondary devices for absorbing or for modifying the direction or polarisation of waves radiated from aerials, and
(ii) combinations with auxiliary devices such as earthing switches, lead-in devices, and lightning protectors;
– both transmitting and receiving aerials. **[3]**

(2) This subclass does not cover devices of the waveguide type, such as resonators or lines, not designed as radiating elements, which are covered by subclass H01P.

(3) In this subclass, the following expression is used with the meaning indicated:
– "active radiating element" covers corresponding parts of a receiving aerial. **[3]**

Subclass Index

1/00 **Details of, or arrangements associated with, aerials** (arrangements for varying orientation of directional pattern H01Q 3/00)

Notes

(1) This group covers only:
- structural details or features of aerials not dependent on electric operation;
- structural details or features applicable to more than one type of aerial or aerial element.

(2) Structural details or features described with reference to, or clearly applicable only to, aerials or aerial elements of a particular type are classified in the group appropriate to that type.

1/02 . Arrangements for de-icing; Arrangements for drying-out

1/08 . Means for collapsing aerials or parts thereof (collapsible loop aerials H01Q 7/00; collapsible H-aerials or Yagi aerials H01Q 19/00)

1/12 . Supports; Mounting means (supporting conductors in general H02G 7/00)

1/14 . . for wire or other non-rigid radiating elements

1/18 . . Means for stabilising aerials on an unstable platform

1/20 . . Resilient mountings

1/22 . . by structural association with other equipment or articles

1/24 . . . with receiving set

1/27 . Adaptation for use in or on movable bodies (H01Q 1/08, H01Q 1/12, H01Q 1/18 take precedence) **[3]**

1/32 . . Adaptation for use in or on road or rail vehicles (telescopic elements H01Q 1/08; resilient mountings for aerials H01Q 1/20) **[3]**

1/36 . Structural form of radiating elements, e.g. cone, spiral, umbrella (H01Q 1/08, H01Q 1/14 take precedence)

1/38 . . formed by a conductive layer on an insulating support (conductors in general H01B 5/14)

1/42 . Housings not intimately mechanically associated with radiating elements, e.g. radome

1/44 . using equipment having another main function to serve additionally as an aerial (H01Q 1/27 takes precedence)

1/50 . Structural association of aerials with earthing switches, lead-in devices, or lightning protectors (lead-in devices H01B; lightning protectors, switches H01H)

3/00 **Arrangements for changing or varying the orientation or the shape of the directional pattern of the waves radiated from an aerial or aerial system**

3/02 . using mechanical movement of aerial or aerial system as a whole

3/08 . . for varying two co-ordinates of the orientation

3/22 . varying the orientation in accordance with variation of frequency of radiated wave

3/24 . varying the orientation by switching energy from one active radiating element to another, e.g. for beam switching

3/26 . varying the relative phase or relative amplitude of energisation between two or more active radiating elements; varying the distribution of energy across a radiating aperture (H01Q 3/22, H01Q 3/24 take precedence)

3/28 . . varying the amplitude **[3]**

3/30 . . varying the phase **[3]**

5/00 **Arrangements for simultaneous operation of aerials on two or more different wavebands** (length of elements adjustable H01Q 9/04; combinations of separate active aerial units operating in different wavebands and connected to a common feeder system H01Q 21/30) **[3]**

7/00 **Loop aerials with a substantially uniform current distribution around the loop and having a directional radiation pattern in a plane perpendicular to the plane of the loop**

9/00 **Electrically-short aerials having dimensions not more than twice the operating wavelength and consisting of conductive active radiating elements** (loop aerials H01Q 7/00; waveguide horns or mouths H01Q 13/00; slot aerials H01Q 13/00; combinations of active elements with secondary devices to give desired directional characteristic H01Q 19/00; combinations of two or more active elements H01Q 21/00)

9/04 . Resonant aerials (telescopic elements H01Q 1/08)

11/00 **Electrically-long aerials having dimensions more than twice the shortest operating wavelength and consisting of conductive active radiating elements** (leaky-waveguide aerials, slot aerials H01Q 13/00; combinations of active elements with secondary devices to give desired directional characteristic H01Q 19/00; aerial arrays or systems H01Q 21/00)

13/00 **Waveguide horns or mouths**; **Slot aerials**; **Leaky-waveguide aerials**; **Equivalent structures causing radiation along the transmission path of a guided wave** (multimode aerials H01Q 25/00)

13/08 . Radiating ends of two-conductor microwave transmission lines, e.g. of coaxial lines, of microstrip lines

13/10 . Resonant slot aerials

13/20 . Non-resonant leaky-waveguide or transmission-line aerials; Equivalent structures causing radiation along the transmission path of a guided wave

15/00 **Devices for reflection, refraction, diffraction, or polarisation of waves radiated from an aerial, e.g. quasi-optical devices** (variable for purpose of altering directivity H01Q 3/00; arrangements of such devices for guiding waves H01P 3/00; variable for purpose of modulation H03C 7/00)

15/14 . Reflecting surfaces; Equivalent structures

17/00 **Devices for absorbing waves radiated from an aerial**; **Combinations of such devices with active aerial elements or systems**

19/00 **Combinations of primary active aerial elements and units with secondary devices, e.g. with quasi-optical devices, for giving the aerial a desired directional characteristic**

19/10 . using reflecting surfaces

21/00 **Aerial arrays or systems** (producing a beam the orientation or the shape of the directional pattern of which can be changed or varied H01Q 3/00; electrically-long aerials H01Q 11/00)

21/06 . Arrays of individually energised aerial units similarly polarised and spaced apart

21/08 . . the units being spaced along, or adjacent to, a rectilinear path

21/20 . . the units being spaced along, or adjacent to, a curvilinear path

21/22 . . Aerial units of the array energised non-uniformly in amplitude or phase, e.g. tapered array, binomial array

21/24 . Combinations of aerial units polarised in different directions for transmitting or receiving circularly and elliptically polarised waves or waves linearly polarised in any direction

21/30 . Combinations of separate aerial units operating in different wavebands and connected to a common feeder system

23/00 Aerials with active circuits or circuit elements integrated within them or attached to them [3]

Notes

(1) This group covers only such combinations in which the type of aerial or aerial element is immaterial. **[3]**

(2) Combinations with a particular type of aerial are classified in the group appropriate to that type. **[3]**

25/00 Aerials or aerial systems providing at least two radiating patterns (arrangements for changing or varying the orientation or the shape of the directional pattern H01Q 3/00) **[3]**

H01R ELECTRICALLY-CONDUCTIVE CONNECTIONS; **STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS**; **COUPLING DEVICES**; **CURRENT COLLECTORS** (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching arrangements for the supply or distribution of electric power H02B; installations of electric cables or lines, or of combined optical and electric cables or lines, or of auxiliary apparatus H02G; printed means for providing electric connections to or between printed circuits H05K)

Notes

(1) This subclass covers:
- all kinds of contact-making disconnectable and non-disconnectable electric line connecting devices, coupling devices, lamp or similar holders or current collectors for all kinds of electric lines, cables or apparatus;
- non-printed means for electric connections to or between printed circuits.

(2) This subclass does not cover mounting of connections in or on specified apparatus. Such mounting is covered by the relevant subclass for such apparatus, e.g. mounting in junction or distribution boxes is covered by subclass H02B or H02G, high-temperature connections for heating elements is covered by group H05B 3/06. Structural association of one part of a coupling device with specific electric apparatus is classified with the apparatus, e.g. association of cap with incandescent lamp is covered by subclass H01K.

(3) In this subclass, the following expressions are used with the meaning indicated: **[7]**
- "pin" is a rigid or flexible conductor for engagement with an appropriately shaped socket to establish contact therewith; **[7]**
- "socket" is a rigid or flexible conductor for receiving an appropriate pin to establish electrical contact therewith; **[7]**
- "coupling devices" are devices having two or more parts specially adapted so as to be capable of ready and repeated physical engagement or disengagement, without the use of a tool, for the purpose of establishing or breaking an electrical path. Examples of such devices having more than two parts are: a) adapters for linking two coupling parts; and b) rails or bus-bars provided with a plurality of discrete connecting locations for counterparts. **[7]**

(4) General details are classified in groups H01R 4/00, H01R 9/00, H01R 11/00, H01R 12/00.

Subclass Index

3/00 Electrically-conductive connections not otherwise provided for

4/00 **Electrically-conductive connections between two or more conductive members in direct contact, i.e. touching one another**; **Means for effecting or maintaining such contact**; **Electrically-conductive connections having two or more spaced connecting locations for conductors and using contact members penetrating insulation** (details of contacts of coupling devices H01R 13/00; coupling devices H01R 12/00, H01R 24/00 to H01R 33/00; flexible or turnable line connectors H01R 35/00 non-rotary current collectors H01R 41/00) **[3]**

4/01 . Connections using shape memory materials, e.g. shape memory metal **[7]**

4/02 . Soldered or welded connections (H01R 4/58, H01R 12/00 take precedence) **[3,7]**

4/10 . effected solely by twisting, wrapping, bending, crimping, or other permanent deformation **[3]**

4/24 . Connections using needle-point, slotted-plate, or analogous contact members penetrating insulation or cable strands **[3]**

4/28 . Clamped connections; Spring connections (made by means of terminals specially adapted for contact with, or insertion into, printed circuits H01R 12/00) **[3,7]**

4/38 . . using a clamping member acted on by screw or nut (H01R 4/50 takes precedence) **[3]**

4/48 . . using a spring, clip or other resilient member (H01R 4/52 takes precedence) **[3]**

4/50 . . using a cam, wedge, cone or ball **[3]**

4/52 . . . which is spring loaded **[3]**

4/58 . characterised by the form or material of the contacting members (H01R 4/01 takes precedence) **[3,7]**

4/64 . . Connections between or with conductive parts having primarily a non-electric function, e.g. frame, casing, rail **[3]**

4/66 . . Connections with the terrestrial mass, e.g. earth plate, earth pin **[3]**

4/70 . Insulation of connections (end caps H01R 4/00) **[3]**

9/00 **Structural associations of a plurality of mutually-insulated electrical connecting elements, e.g. terminal strips, terminal blocks**; **Terminals or binding posts mounted upon a base or in a case**; **Bases therefor** (details of direct connections or connections using contact members penetrating insulation H01R 4/00; specially adapted for printed circuits, flat or ribbon cables, or like generally planar structures H01R 12/00; coupling devices H01R 12/00, H01R 24/00 to H01R 33/00; flexible or turnable line connectors H01R 35/00) **[3]**

9/03 . Connectors arranged to contact a plurality of the conductors of a multiconductor cable **[3]**

9/05 . . for coaxial cables **[3]**

9/22 . Bases, e.g. strip, block, panel **[3]**

9/24 . . Terminal blocks **[3]**

11/00 **Individual connecting elements providing two or more spaced connecting locations for conductive members which are, or may be, thereby interconnected, e.g. end pieces for wires or cables supported by the wire or cable and having means for facilitating electrical connection to some other wire, terminal, or conductive member, blocks of binding posts** (connections between members in direct contact H01R 4/00; structural associations of a plurality of mutually-insulated electrical connecting elements H01R 9/00; coupling devices H01R 12/00, H01R 24/00 to H01R 29/00, H01R 33/00; flexible or turnable line connectors H01R 35/00) **[3]**

11/01 . characterised by the form or arrangement of the conductive interconnection between their connecting locations **[3]**

11/11 . End pieces or tapping pieces for wires or cables, supported by the wire or cable and having means for facilitating electrical connection to some other wire, terminal, or conductive member (H01R 11/01 takes precedence) **[3]**

12/00 **Structural associations of a plurality of mutually-insulated electrical connecting elements, specially adapted for printed circuits, e.g. printed circuit boards (PCBs), flat or ribbon cables, or like generally planar structures, e.g. terminal strips, terminal blocks**; **Coupling devices specially adapted for printed circuits, flat or ribbon cables, or like generally planar structures**; **Terminals specially adapted for contact with, or insertion into, printed circuits, flat or ribbon cables, or like generally planar structures** (printed connections to, or between, printed circuits H05K 1/11) **[7]**

13/00 **Details of coupling devices of the kinds covered by groups H01R 12/00 or H01R 24/00 to H01R 33/00 [1,7]**

13/02 . Contact members

13/03 . . characterised by the material, e.g. plating or coating materials **[4]**

13/04 . . Pins or blades for co-operation with sockets (carrying separate resilient parts H01R 13/15)

13/10 . . Sockets for co-operation with pins or blades

13/11 . . . Resilient sockets (carrying separate resilient parts H01R 13/15) **[3]**

13/115 . . . . U-shaped sockets having inwardly-bent legs **[3]**

13/15 . . Pins, blades or sockets having separate spring member for producing or increasing contact pressure **[3]**

13/22 . . Contacts for co-operating by abutting

13/40 . Securing contact members in or to a base or case; Insulating of contact members

13/42 . . Securing in a demountable manner

13/422 . . . in resilient one-piece base or case; One-piece base or case formed with resilient locking means **[3]**

13/424 . . . in base or case composed of a plurality of insulating parts having at least one resilient insulating part **[3]**

13/426 . . . by separate resilient retaining piece supported by base or case, e.g. collar **[3]**

13/428 . . . by resilient locking means on the contact members; by locking means on resilient contact members **[3]**

13/436 . . . Securing a plurality of contact members by one locking piece **[3]**

13/44 . Means for preventing access to live contacts

13/46 . Bases; Cases
13/50 . . formed as an integral body (H01R 13/514 takes precedence) **[3]**
13/502 . . composed of different pieces (H01R 13/514 takes precedence) **[3]**
13/514 . . formed as a modular block or assembly, i.e. composed of co-operating parts provided with contact members or holding contact members between them **[3]**
13/516 . . Means for holding or embracing insulating body, e.g. casing **[3]**
13/52 . . Dustproof, splashproof, drip-proof, waterproof, or flameproof cases
13/523 . . . for use under water **[3]**
13/527 . . . Flameproof cases (H01R 13/70 takes precedence) **[3]**
13/53 . . Bases or cases for heavy duty; Bases or cases with means for preventing corona or arcing **[3]**
13/533 . . Bases or cases made for use in extreme conditions, e.g. high temperature, radiation, vibration, corrosive environment, pressure (H01R 13/52 takes precedence) **[3]**
13/58 . Means for relieving strain on wire connection, e.g. cord grip
13/62 . Means for facilitating engagement or disengagement of coupling parts or for holding them in engagement **[3]**
13/621 . . Bolt, set screw or screw clamp **[3,5]**
13/625 . . Casing or ring with bayonet engagement **[3,5]**
13/627 . . Snap-action fastening **[3]**
13/629 . . Additional means for facilitating engagement or disengagement of coupling parts, e.g. aligning or guiding means, levers, gas pressure **[3]**
13/631 . . . for engagement only **[3]**
13/633 . . . for disengagement only **[3]**
13/639 . . Additional means for holding or locking coupling parts together after engagement **[3]**
13/64 . Means for preventing, inhibiting or avoiding incorrect coupling
13/642 . . by position or shape of contact members **[3]**
13/645 . . by exchangeable elements on case or base **[3]**
13/648 . Protective earth or shield arrangements on coupling devices **[3]**
13/652 . . with earth pin, blade or socket **[3]**
13/655 . . with earth brace **[3]**
13/658 . . High frequency shielding arrangements **[3]**
13/66 . Structural association with built-in electrical component
13/68 . . with built-in fuse
13/70 . . with built-in switch
13/719 . . specially adapted for high frequency, e.g. with filters **[4]**
13/73 . Means for mounting coupling parts to apparatus or structures, e.g. to a wall **[4]**
13/74 . . for mounting coupling parts in openings of a panel **[3]**

24/00 Two-part coupling devices, or either of their cooperating parts, characterised by their overall structure (specially adapted for printed circuits, flat or ribbon cables, or like structures H01R 12/00; specially adapted for supporting apparatus H01R 33/00) **[7]**

25/00 Coupling parts adapted for simultaneous co-operation with two or more identical counterparts, e.g. for distributing energy to two or more circuits (supported only by co-operation with a counterpart H01R 31/00; with a holder adapted for supporting apparatus to which its counterpart is attached H01R 33/00)

27/00 Coupling parts adapted for co-operation with two or more dissimilar counterparts (supported only by co-operation with a counterpart H01R 31/00; with a holder adapted for supporting apparatus to which its counterpart is attached H01R 33/00)

29/00 Coupling parts for selective co-operation with a counterpart in different ways to establish different circuits, e.g. for voltage selection, for series/parallel selection

31/00 Coupling parts supported only by co-operation with counterpart
31/06 . Intermediate parts for linking two coupling parts, e.g. adapter (with a holder adapted for supporting apparatus to which its counterpart is attached H01R 33/00) **[4]**

33/00 Coupling devices specially adapted for supporting apparatus and having one part acting as a holder providing support and electrical connection via a counterpart which is structurally associated with the apparatus, e.g. lamp holders; **Separate parts thereof** (structural association of counterpart with specific apparatus, see the relevant subclass for the apparatus)
33/05 . Two-pole devices **[4]**
33/74 . Devices having four or more poles
33/76 . . Holders with sockets, clips or analogous contacts, adapted for axially-sliding engagement with parallely-arranged pins, blades, or analogous contacts on counterpart, e.g. electronic tube socket

35/00 Flexible or turnable line connectors (rotary current collectors, distributors H01R 39/00)

39/00 Rotary current collectors, distributors, or interrupters (cam-operated switches H01H 19/00; structural associations of current collectors with, or disposition of current collectors in, dynamo-electric motors or generators H02K 13/00)

41/00 Non-rotary current collectors for maintaining contact between moving and stationary parts of an electric circuit (end pieces terminating in a hook or the like H01R 11/11; current collectors for power supply lines of electrically-propelled vehicles B60L 5/00)

43/00 Apparatus or processes specially adapted for manufacturing, assembling, maintaining, or repairing of line connectors or current collectors or for joining electric conductors (of trolley lines B60M 1/00; joining cables H02G 1/14)
43/01 . for connecting unstripped conductors to contact members having insulation cutting edges **[4]**
43/02 . for soldered or welded connections (soldering or welding in general B23K)
43/027 . for connecting conductors by clips **[4]**
43/033 . for wrapping or unwrapping wire connections **[4]**
43/04 . for forming connections by deformation, e.g. crimping tool
43/06 . Manufacture of commutators
43/10 . Manufacture of slip-rings
43/12 . Manufacture of brushes

43/14 . Maintenance of current collectors, e.g. reshaping of brushes, cleaning of commutators
43/16 . for manufacturing contact members, e.g. by punching and by bending **[4]**
43/18 . for manufacturing bases or cases for contact members **[4]**
43/20 . for assembling or disassembling contact members with insulating base, case or sleeve **[4]**
43/26 . for engaging or disengaging the two parts of a coupling device (structural association with coupling device H01R 13/629) **[4]**
43/28 . for wire processing before connecting to contact members (H01R 43/02 to H01R 43/26 take precedence) **[4]**

H01S DEVICES USING STIMULATED EMISSION

Note

This subclass covers:
– devices for the generation or amplification, by using stimulated emission, of coherent electromagnetic waves or other forms of wave energy; **[2]**
– such functions as modulating, demodulating, controlling, or stabilising such waves. **[2]**

Subclass Index

1/00 Masers, i.e. devices for generation, amplification, modulation, demodulation, or frequency-changing, using stimulated emission, of electromagnetic waves of wavelength longer than that of infra-red waves

3/00 Lasers, i.e. devices for generation, amplification, modulation, demodulation, or frequency-changing, using stimulated emission, of infra-red, visible, or ultra-violet waves (semiconductor lasers H01S 5/00)

3/02 . Constructional details
3/03 . . of gas laser discharge tubes **[2]**
3/036 . . . Means for obtaining or maintaining the desired gas pressure within the tube, e.g. by gettering, replenishing; Means for circulating the gas, e.g. for equalising the pressure within the tube (cooling arrangements for gas lasers H01S 3/04; gas dynamic lasers H01S 3/0979) **[5]**
3/038 . . . Electrodes, e.g. special shape, configuration or composition **[5]**
3/04 . . Cooling arrangements
3/05 . Construction or shape of optical resonators; Accommodation of active medium therein; Shape of active medium
3/06 . . Construction or shape of active medium
3/08 . . Construction or shape of optical resonators or components thereof **[2]**
3/081 . . . comprising more than two reflectors **[2]**
3/086 . . . One or more reflectors having variable properties or positions for initial adjustment of the resonator (varying a parameter of the laser output during operation H01S 3/10; stabilisation of the laser output H01S 3/13) **[2]**
3/09 . Processes or apparatus for excitation, e.g. pumping
3/091 . . using optical pumping **[2]**
3/0915 . . . by incoherent light **[5]**
3/094 . . . by coherent light **[2]**
3/0941 . . . . of a semiconductor laser, e.g. of a laser diode **[6]**
3/0943 . . . . of a gas laser **[5]**
3/0947 . . . . of an organic dye laser **[5]**
3/0955 . . using pumping by high energy particles **[5]**
3/097 . . by gas discharge of a gas laser **[2]**
3/0971 . . . transversely excited (H01S 3/0975 takes precedence) **[5]**
3/0975 . . . using inductive or capacitive excitation **[5]**
3/0977 . . . having auxiliary ionisation means **[5]**
3/0979 . . . Gas dynamic lasers, i.e. with expansion of the laser gas medium to supersonic flow speeds **[5]**
3/098 . Mode locking; Mode suppression (mode suppression using a plurality of resonators H01S 3/081) **[2]**
3/10 . Controlling the intensity, frequency, phase, polarisation or direction of the emitted radiation, e.g. switching, gating, modulating or demodulating (mode locking H01S 3/098; controlling of light beams, frequency-changing, non-linear optics, optical logic elements, in general G02F) **[2]**
3/101 . . Lasers provided with means to change the location from which, or the direction in which, laser radiation is emitted (optical scanning systems in general G02B 26/10; devices or arrangements for the electro-, magneto-, or acousto-optical deflection G02F 1/29) **[2]**
3/102 . . by controlling the active medium, e.g. by controlling the processes or apparatus for excitation (H01S 3/13 takes precedence) **[4]**
3/104 . . . in gas lasers **[4]**
3/105 . . by controlling the mutual position or the reflecting properties of the reflectors of the cavity (H01S 3/13 takes precedence) **[4]**
3/106 . . by controlling a device placed within the cavity (H01S 3/13 takes precedence) **[4]**
3/108 . . . using a non-linear optical device, e.g. exhibiting Brillouin- or Raman-scattering **[4]**
3/109 . . . . Frequency multiplying, e.g. harmonic generation **[4]**
3/11 . . in which the quality factor of the optical resonator is rapidly changed, i.e. giant-pulse technique

3/13 . . Stabilisation of laser output parameters, e.g. frequency, amplitude **[2]**

3/131 . . . by controlling the active medium, e.g. by controlling the processes or apparatus for excitation **[4]**

3/134 . . . . in gas lasers **[4]**

3/14 . characterised by the material used as the active medium

3/16 . . Solid materials

3/17 . . . amorphous, e.g. glass **[2]**

3/23 . Arrangement of two or more lasers not provided for in groups H01S 3/02 to H01S 3/14, e.g. tandem arrangement of separate active media (involving only semiconductor lasers H01S 5/00) **[2,7]**

3/30 . using scattering effects, e.g. stimulated Brillouin or Raman effects **[2]**

4/00 Devices using stimulated emission of wave energy other than those covered by groups H01S 1/00, H01S 3/00 or H01S 5/00, e.g. phonon maser, gamma maser

5/00 Semiconductor lasers [7]

H01T SPARK GAPS; **OVERVOLTAGE ARRESTERS USING SPARK GAPS**; **SPARKING PLUGS**; **CORONA DEVICES**; **GENERATING IONS TO BE INTRODUCED INTO NON-ENCLOSED GASES** (working of metal by the action of a high concentration of electric current B23H; welding, e.g. arc welding, electron beam welding or electrolytic welding, B23K; gas-filled discharge tubes with solid cathode H01J 17/00; electric arc lamps H05B 31/00)

Note

In this subclass, the following expression is used with the meaning indicated:
– "spark gaps" means enclosed or non-enclosed discharge device having cold electrodes and used exclusively to discharge a quantity of electrical energy in a small time duration. **[4]**

Subclass Index

1/00 Details of spark gaps

2/00 Spark gaps comprising auxiliary triggering means (triggering circuits H01T 15/00) **[4]**

4/00 Overvoltage arresters using spark gaps (H01T 2/00 takes precedence; overvoltage protection circuits using spark gaps H02H 9/06) **[4]**

7/00 Rotary spark gaps, i.e. devices having one or more rotating electrodes

9/00 Spark gaps specially adapted for generating oscillations

11/00 Spark gaps specially adapted as rectifiers

13/00 Sparking-plugs (combined or associated with fuel injectors F02M 57/00; structurally combined with other parts of internal-combustion engines F02P 13/00; testing sparking-plugs G01M 19/02)

13/20 . characterised by features of the electrodes or insulation

13/39 . . Selection of materials for electrodes **[4]**

14/00 Spark gaps not provided for in groups H01T 2/00 to H01T 13/00 (devices providing for corona discharge H01T 19/00) **[4]**

15/00 Circuits specially adapted for spark gaps, e.g. ignition circuits (ignition circuits for internal-combustion engines F02P; electric spark ignition for combustion apparatus F23Q; protection circuits using spark gaps H02H 9/06) **[4]**

19/00 Devices providing for corona discharge (for charging electrographic elements G03G 15/02) **[4]**

21/00 Apparatus or processes specially adapted for the manufacture or maintenance of spark gaps or sparking plugs

23/00 Apparatus for generating ions to be introduced into non-enclosed gases, e.g. into the atmosphere (discharge tubes with provision for emergence of ions from the vessel H01J 33/00; generating plasma H05H) **[4]**

H02 GENERATION, CONVERSION, OR DISTRIBUTION OF ELECTRIC POWER

H02B BOARDS, SUBSTATIONS, OR SWITCHING ARRANGEMENTS FOR THE SUPPLY OR DISTRIBUTION OF ELECTRIC POWER (basic electric elements, their assembly, including the mounting in enclosures or on bases, or the mounting of covers thereon, see the subclasses for such elements, e.g. transformers H01F, switches, fuses H01H, line connectors H01R; installation of electric cables or lines, or of combined optical and electric cables or lines, or other conductors for supply or distribution H02G)

Note

This subclass covers boards, switchyards, switchgear or their installation, or the association of switching devices with each other or with other devices, e.g. transformers, fuses, meters or distribution boards; such associations constitute substations or distribution points.

Subclass Index

1/00 Frameworks, boards, panels, desks, casings; Details of substations or switching arrangements [5]

1/015 . Boards, panels, desks; Parts thereof or accessories therefor **[5]**

1/20 . Bus-bar or other wiring layouts, e.g. in cubicles, in switchyards (installations of bus-bars H02G 5/00)

3/00 Apparatus specially adapted for the manufacture, assembly, or maintenance of boards or switchgear

5/00 Non-enclosed substations; Substations with enclosed and non-enclosed equipment

7/00 Enclosed substations, e.g. compact substations [5]

11/00 Switchgear having carriage withdrawable for isolation

13/00 Arrangement of switchgear in which switches are enclosed in, or structurally associated with, a casing, e.g. cubicle (in association with main transformer H02B 5/00, H02B 7/00; switchgear having carriage withdrawable for isolation H02B 11/00) **[5]**

13/02 . with metal casing

13/025 . . Safety arrangements, e.g. in case of excessive pressure or fire due to electrical defect (for buildings in general E04B 1/94; devices for opening or closing safety wings E05F 1/00; emergency protective circuit arrangements for distribution gear, e.g. bus-bar systems, or for switching devices H02H 7/00) **[5]**

13/035 . . Gas-insulated switchgear **[5]**

15/00 Supervisory desks or panels for centralised control or display (desks in general A47B)

***99/00 Subject matter not provided for in other groups of this subclass* [2009.01]**

H02G INSTALLATION OF ELECTRIC CABLES OR LINES, OR OF COMBINED OPTICAL AND ELECTRIC CABLES OR LINES (insulated conductors or cables with arrangements for facilitating mounting or securing H01B 7/00; distribution points incorporating switches H02B; guiding telephone cords H04M 1/15; cable ducts or mountings for telephone or telegraph exchange installations H04Q 1/02)

Notes

(1) This subclass covers installation of communication cables or lines, including those comprising a combination of optical and electrical conductors, or of lightning conductors as well as installation of power cables or lines.

(2) This subclass does not cover installation of purely optical cables, which is covered by group G02B 6/46. **[6]**

(3) In this subclass, the following expression is used with the meaning indicated: **[6]**
– "electric cable" includes cables comprising optical conductors, e.g. fibres, in combination with electrical conductors. **[6]**

Subclass Index

1/00 Methods or apparatus specially adapted for installing, maintaining, repairing, or dismantling electric cables or lines

1/02 . for overhead lines or cables

1/04 . . for mounting or stretching (wire stretchers in general B25B 25/00)

1/06 . for laying cables, e.g. laying apparatus on vehicle (combined with trench digging or back-filling machines or dredgers E02F 5/00)

1/08 . . through tubing or conduit, e.g. rod or draw wire for pushing or pulling

1/10 . . in or under water

1/12 . for removing insulation or armouring from cables, e.g. from the end thereof (pliers in general B25B; cutters in general B26B; insulated conductors or cables with arrangements for facilitating removal of insulation H01B 7/00)

1/14 . for joining or terminating cables (joining electric conductors H01R 43/00)

3/00 Installations of electric cables or lines or protective tubing therefor in or on buildings, equivalent structures or vehicles (installations of bus-bars H02G 5/00; overhead installations H02G 7/00; installations in or on the ground H02G 9/00; channels or vertical ducts for receiving utility lines E04F 17/00; wiring of electric apparatus in general H05K)

3/02 . Details

3/04 . . Protective tubing or conduits, e.g. cable ladders, cable troughs (pipes or tubing in general F16L)

3/08 . . Distribution boxes; Connection or junction boxes (cable terminations H02G 15/02)

3/12 . . . for flush mounting

3/14 . . . Fastening of cover or lid to box

3/16 . . . structurally associated with support for line-connecting terminals within the box (terminals H01R 9/00)

3/18 . . . providing line outlets

3/22 . Installations of cables or lines through walls, floors, or ceilings, e.g. into buildings (devices for use where pipes or cables pass through walls or partitions F16L 5/00; lead-in or lead-through insulators H01B 17/26; insulating tubes or sleeves H01B 17/58)

3/30 . Installations of cables or lines on walls, floors or ceilings (supports for pipes, cables or protective tubing F16L 3/00; hose-clips F16L 33/02) **[7]**

3/36 . Installations of cables or lines in walls, floors or ceilings (H02G 3/22 takes precedence) **[7]**

5/00 Installations of bus-bars

7/00 Overhead installations of electric lines or cables (installations of bus-bars H02G 5/00; trolley wires or contact lines for electric railways B60M; fastening conductors to insulators H01B 17/00, e.g. H01B 17/02, H01B 17/14; protection against abnormal electric conditions H01H; hook contacts for temporary connections to overhead lines H01R 11/11)

7/02 . Devices for adjusting or maintaining mechanical tension, e.g. take-up device

7/16 . Devices for removing snow or ice from lines or cables (from insulators H01B 17/00)

7/20 . Spatial arrangements or dispositions of lines or cables on poles, posts, or towers (construction of poles, posts, or towers E04H 12/22)

9/00 Installations of electric cables or lines in or on the ground or water (cathodic protection C23F 13/00; detection of buried cables G01V)

9/06 . in underground tubes or conduits; Tubes or conduits therefor

11/00 Arrangements of electric cables or lines between relatively-movable parts (current collectors H01R)

13/00 Installations of lightning conductors; **Fastening thereof to supporting structure** (indicating, counting or recording lightning strokes G01; lightning arrestors H01C 7/12, H01C 8/00, H01G 9/18, H01T; earth plates, pins or other contacts H01R)

15/00 Cable fittings

15/007 . Devices for relieving mechanical stress **[3]**

15/02 . Cable terminations (for gas- or oil-filled cables H02G 15/00)

15/08 . Cable junctions (for gas or oil filled cables H02G 15/00; disconnectable junctions, electrical connections H01R)

15/10 . . protected by boxes, e.g. by distribution, connection or junction boxes (terminal blocks H01R 9/00)

15/18 . . protected by sleeves, e.g. for communication cable (two-part covers H02G 15/10)

H02H EMERGENCY PROTECTIVE CIRCUIT ARRANGEMENTS (indicating or signalling undesired working conditions G01R, e.g. G01R 31/00, G08B; locating faults along lines G01R 31/08; emergency protective devices H01H)

Note

This subclass covers only circuit arrangements for the automatic protection of electric lines or electric machines or apparatus in the event of an undesired change from normal working conditions.

Subclass Index

1/00 Details of emergency protective circuit arrangements

3/00 Emergency protective circuit arrangements for automatic disconnection directly responsive to an undesired change from normal electric working condition, with or without subsequent reconnection (specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems H02H 7/00; systems for change-over to standby supply H02J 9/00)

- 3/02 . Details
- 3/05 . . with means for increasing reliability, e.g. redundancy arrangements **[3]**
- 3/08 . responsive to excess current (responsive to abnormal temperature caused by excess current H02H 5/00)
- 3/087 . . for dc applications **[3]**
- 3/093 . . with timing means **[3]**
- 3/12 . responsive to underload or no-load
- 3/14 . responsive to occurrence of voltage on parts normally at earth potential
- 3/16 . responsive to fault current to earth, frame or mass (with balanced or differential arrangement H02H 3/26)
- 3/18 . responsive to reversal of direct current
- 3/20 . responsive to excess voltage
- 3/24 . responsive to undervoltage or no-voltage
- 3/26 . responsive to difference between voltages or between currents; responsive to phase angle between voltages or between currents
- 3/32 . . involving comparison of the voltage or current values at corresponding points in different conductors of a single system, e.g. of currents in go and return conductors
- 3/38 . responsive to both voltage and current; responsive to phase angle between voltage and current
- 3/40 . responsive to ratio of voltage and current
- 3/42 . responsive to product of voltage and current
- 3/44 . responsive to the rate of change of electrical quantities **[3]**
- 3/46 . responsive to frequency deviations **[3]**
- 3/48 . responsive to loss of synchronism **[3]**
- 3/50 . responsive to the appearance of abnormal wave forms, e.g. ac in dc installations **[3]**

5/00 Emergency protective circuit arrangements for automatic disconnection directly responsive to an undesired change from normal non-electric working conditions with or without subsequent reconnection (using simulators of the apparatus being protected H02H 6/00; specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems H02H 7/00) **[3]**

6/00 Emergency protective circuit arrangements responsive to undesired changes from normal non-electric working conditions using simulators of the apparatus being protected, e.g. using thermal images [3]

7/00 Emergency protective circuit arrangements specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems, and effecting automatic switching in the event of an undesired change from normal working conditions (structural association of protective devices with specific machines or apparatus and their protection without automatic disconnection, see the relevant subclass for the machine or apparatus)

- 7/04 . for transformers
- 7/06 . for dynamo-electric generators; for synchronous capacitors
- 7/08 . for dynamo-electric motors
- 7/085 . . against excessive load
- 7/10 . for converters; for rectifiers
- 7/12 . . for static converters or rectifiers
- 7/122 . . . for inverters, i.e. dc/ac converters **[2]**
- 7/18 . for batteries; for accumulators
- 7/20 . for electronic equipment (for converters H02H 7/10; for electric measuring instruments G01R 1/00; for dc voltage or current semiconductor regulators G05F 1/10; for amplifiers H03F 1/52; for electronic switching circuits H03K 17/08)
- 7/26 . Sectionalised protection of cable or line systems, e.g. for disconnecting a section on which a short-circuit, earth fault, or arc discharge has occurred (locating faults in cables G01R 31/08)

9/00 **Emergency protective circuit arrangements for limiting excess current or voltage without disconnection** (structural association of protective devices with specific machines or apparatus, see the relevant subclass for the machine or apparatus)

9/02 . responsive to excess current

9/04 . responsive to excess voltage (lightning arrestors H01C 7/12, H01C 8/00, H01G 9/18, H01T)

9/06 . . using spark-gap arresters

11/00 **Emergency protective circuit arrangements for preventing the switching-on in case an undesired electric working condition might result**

99/00 ***Subject matter not provided for in other groups of this subclass*** **[2009.01]**

H02J **CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER**; **SYSTEMS FOR STORING ELECTRIC ENERGY** (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/00; electric power supply circuits specially adapted for use in electronic time-pieces with no moving parts G04G 19/00; for digital computers G06F 1/18; for discharge tubes H01J 37/02; circuits or apparatus for the conversion of electric power, arrangements for control or regulation of such circuits or apparatus H02M; interrelated control of several motors, control of a prime-mover/generator combination H02P; control of high-frequency power H03L; additional use of power line or power network for transmission of information H04B)

Notes

(1) This subclass covers:
- ac or dc mains or distribution networks;
- circuit arrangements for battery supplies, including charging or control thereof, or co-ordinated supply from two or more sources of any kind;
- systems for supplying or distributing electric power by electromagnetic waves.

(2) This subclass does not cover:
- control of a single motor, generator or dynamo-electric converter, of the types covered by subclass H01F or H02K, which is covered by subclass H02P;
- control of a single motor or generator, of the types covered by subclass H02N, which is covered by that subclass.

Subclass Index

1/00 **Circuit arrangements for dc mains or dc distribution networks**

1/02 . Arrangements for reducing harmonics or ripples (in converters H02M 1/14)

1/04 . Constant-current supply systems

1/06 . Two-wire systems

1/08 . Three-wire systems; Systems having more than three wires

1/10 . Parallel operation of dc sources (involving batteries H02J 7/34)

1/14 . Balancing the load in a network (by batteries H02J 7/34)

3/00 **Circuit arrangements for ac mains or ac distribution networks**

3/01 . Arrangements for reducing harmonics or ripples (in converters H02M 1/12) **[3]**

3/02 . using a single network for simultaneous distribution of power at different frequencies; using a single network for simultaneous distribution of ac power and of dc power

3/04 . for connecting networks of the same frequency but supplied from different sources

3/10 . Constant-current supply systems

3/12 . for adjusting voltage in ac networks by changing a characteristic of the network load

3/18 . Arrangements for adjusting, eliminating, or compensating reactive power in networks (for adjustment of voltage H02J 3/12; use of Petersen coils H02H 9/00)

3/24 . Arrangements for preventing or reducing oscillations of power in networks (by control effected upon a single generator H02P 9/00)

3/26 . Arrangements for eliminating or reducing asymmetry in polyphase networks

3/28 . Arrangements for balancing the load in a network by storage of energy

3/34 . Arrangements for transfer of electric power between networks of substantially different frequency (frequency converters H02M)

3/36 . Arrangements for transfer of electric power between ac networks via a high-tension dc link

3/38 . Arrangements for parallelly feeding a single network by two or more generators, converters, or transformers

3/40 . . Synchronising a generator for connection to a network or to another generator

3/46 . . Controlling the sharing of output between the generators, converters, or transformers

4/00 Circuit arrangements for mains or distribution networks not specified as ac or dc [2]

5/00 Circuit arrangements for transfer of electric power between ac networks and dc networks (H02J 3/36 takes precedence)

7/00 Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries

7/02 . for charging batteries from ac mains by converters

7/04 . . Regulation of the charging current or voltage

7/06 . . . using discharge tubes or semiconductor devices

7/10 . . . . using semiconductor devices only

7/12 . . . using magnetic devices having controllable degree of saturation, i.e. transductors

7/14 . for charging batteries from dynamo-electric generators driven at varying speed, e.g. on vehicle

7/16 . . Regulation of the charging current or voltage by variation of field

7/32 . for charging batteries from a charging set comprising a non-electric prime mover

7/34 . Parallel operation in networks using both storage and other dc sources, e.g. providing buffering (H02J 7/14 takes precedence) **[4]**

7/35 . . with light sensitive cells **[4]**

7/36 . Arrangements using end-cell switching

9/00 Circuit arrangements for emergency or stand-by power supply, e.g. for emergency lighting (with provision for charging standby battery H02J 7/00)

9/04 . in which the distribution system is disconnected from the normal source and connected to a standby source

9/06 . . with automatic change-over

9/08 . . . requiring starting of a prime-mover

11/00 Circuit arrangements for providing service supply to auxiliaries of stations in which electric power is generated, distributed, or converted (emergency or standby arrangements H02J 9/00)

13/00 Circuit arrangements for providing remote indication of network conditions, e.g. an instantaneous record of the open or closed condition of each circuitbreaker in the network; **Circuit arrangements for providing remote control of switching means in a power distribution network, e.g. switching in and out of current consumers by using a pulse code signal carried by the network**

15/00 Systems for storing electric energy (mechanical systems therefor F01 to F04; in chemical form H01M) **[2]**

17/00 Systems for supplying or distributing electric power by electromagnetic waves [3]

H02K DYNAMO-ELECTRIC MACHINES (measuring instruments G01; dynamo-electric relays H01H 53/00; conversion of dc or ac input power into surge output power H02M 9/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R)

Notes

(1) This subclass covers the structural adaptation of the machines for the purposes of their control.

(2) This subclass does not cover starting, regulating, electronically commutating, braking, or otherwise controlling motors, generators or dynamo-electric converters, in general, which are covered by subclass H02P.

(3) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

Subclass Index

1/00 **Details of the magnetic circuit** (magnetic circuits or magnets in general, magnetic circuits for transformers for power supply H01F; magnetic circuits for relays H01H 50/16)

1/06 . characterised by the shape, form, or construction

1/12 . . Stationary parts of the magnetic circuit

1/14 . . . Stator cores with salient poles

1/16 . . . Stator cores with slots for windings

1/18 . . . Means for mounting or fastening magnetic stationary parts on to, or to, the stator structures

1/22 . . Rotating parts of magnetic circuit

1/27 . . . Rotor cores with permanent magnets **[5]**

1/28 . . . Means for mounting or fastening rotating magnetic parts on to, or to, the rotor structures

1/32 . . . with channels or ducts for flow of cooling medium

3/00 **Details of windings** (coils in general H01F 5/00)

3/04 . Windings characterised by the conductor shape, form, or construction, e.g. with bar conductor

3/12 . . arranged in slots

3/18 . . Windings for salient poles

3/28 . . Layout of windings or of connections between windings (windings for pole-changing H02K 17/02, H02K 19/02, H02K 19/16)

3/32 . Windings characterised by the shape, form, or construction of the insulation

3/46 . Fastening of windings on stator or rotor structure

3/48 . . in slots

3/50 . . Fastening of winding heads, equalising connectors, or connections thereto

5/00 **Casings**; **Enclosures**; **Supports** (casings for electric apparatus in general H05K 5/00)

5/04 . Casings or enclosures characterised by the shape, form, or construction thereof

5/08 . . Insulating casings

5/10 . . affording protection from ingress, e.g. of water, of fingers

5/12 . . specially adapted for operating in liquid or gas (combined with cooling arrangements H02K 9/00)

5/14 . . Means for supporting or protecting brushes or brush holders **[3]**

5/15 . . Mounting arrangements for bearing-shields or end plates **[3]**

5/16 . . Means for supporting bearings, e.g. insulating support, means for fitting the bearing in the bearing-shield (magnetic bearings H02K 7/09)

5/167 . . . using sliding-contact or spherical cap bearings **[3]**

5/173 . . . using ball bearings or bearings with rolling contact **[3]**

5/20 . . with channels or ducts for flow of cooling medium

5/22 . . Other additional parts of casings, e.g. shaped to form connection or terminal box

5/24 . specially adapted for suppression or reduction of noise or vibration

7/00 **Arrangements for handling mechanical energy structurally associated with the machine, e.g. structural association with mechanical driving motor or auxiliary dynamo-electric machine**

7/06 . Means for converting reciprocating into rotary motion or vice versa

7/08 . Structural association with bearings (support in machine casing H02K 5/16)

7/09 . . with magnetic bearings **[3]**

7/10 . Structural association with clutches, brakes, gears, pulleys, mechanical starters

7/116 . . with gears

7/14 . Structural association with mechanical load, e.g. hand-held machine tool, fan (with fan or impeller for cooling the machine H02K 9/04; for suction cleaners A47L)

7/16 . . for operation above critical speed of vibration of rotating parts

7/18 . Structural association of electric generator with mechanical driving motor, e.g. turbine (if the driving-motor aspect predominates, see the relevant place of section F, e.g. F03B 13/00)

9/00 **Systems for cooling or ventilating** (channels or ducts in parts of the magnetic circuit H02K 1/12, H02K 1/32; channels or ducts in or between conductors H02K 3/04)

9/02 . by ambient air flowing through the machine

9/04 . . having means for generating flow of cooling medium, e.g. having fan

9/19 . for machines with closed casing and with closed-circuit cooling using a liquid cooling medium, e.g. oil

9/22 . by solid heat conducting material embedded in, or arranged in contact with, stator or rotor, e.g. heat bridge

11/00 **Structural association with measuring or protective devices or electric components, e.g. with resistor, with switch, with suppressor for radio interference**

11/02 . for suppression of radio interference **[6]**

11/04 . for rectification **[6]**

13/00 **Structural associations of current collectors with motors or generators, e.g. brush mounting plates, connections to windings** (supporting or protecting brushes or brush holders in motor casings or enclosures H02K 5/14); **Disposition of current collectors in motors or generators**; **Arrangements for improving commutation**

13/02 . Connections of slip-rings with the winding

13/04 . Connections of commutator segments with the winding

13/10 . Special arrangements of brushes or commutators for the purpose of improving commutation

13/12 . Means for producing an axial reciprocation of the rotor and its associated current collector part, e.g. for polishing commutator surface

13/14 . Circuit arrangements for improvement of commutation, e.g. by use of unidirectionally conductive element

15/00 Methods or apparatus specially adapted for manufacturing, assembling, maintaining, or repairing dynamo-electric machines (manufacture of current collectors in general H01R 43/00)

15/02 . of stator or rotor bodies

15/03 . . having permanent magnets **[5]**

15/04 . of windings, prior to mounting into the machine (insulating windings H02K 15/00, H02K 15/12; coil manufacture in general H01F 41/02)

15/08 . Forming windings by laying conductors into or around core part

15/12 . Impregnating, heating or drying of windings, stators, rotors, or machines

15/14 . Casings; Enclosures; Supports

16/00 Machines with more than one rotor or stator [2]

Note

Group H02K 16/00 takes precedence over groups H02K 17/00 to H02K 53/00. **[2]**

17/00 Asynchronous induction motors; **Asynchronous induction generators**

17/02 . Asynchronous induction motors

17/16 . . having rotor with internally short-circuited windings, e.g. cage rotor

17/42 . Asynchronous induction generators (H02K 17/02 takes precedence) **[4]**

19/00 Synchronous motors or generators (having permanent magnet H02K 21/00)

19/02 . Synchronous motors

19/16 . Synchronous generators

21/00 Synchronous motors having permanent magnet; **Synchronous generators having permanent magnet** (stator cores with permanent magnets H02K 1/12; rotor cores with permanent magnets H02K 1/27)

21/12 . with stationary armature and rotating magnet

21/14 . . magnet rotating within armature

21/16 . . . having an annular armature core with salient poles (with homopolar co-operation H02K 21/14)

21/22 . . magnet rotating around armature, e.g. flywheel magneto

23/00 Dc commutator motors or generators having mechanical commutator; **Universal ac/dc commutator motors**

23/02 . characterised by the exciting arrangement

23/26 . characterised by the armature winding

23/40 . characterised by the arrangement of the magnet circuit

23/50 . Generators with two or more outputs

23/52 . Motors acting also as generators, e.g. starting motor used as generator for ignition or lighting

23/54 . Disc armature motors or generators

23/56 . Motors or generators having the iron core separated from armature winding

23/58 . Motors or generators having no iron core

23/60 . Motors or generators having a rotating armature and a rotating excitation field

23/62 . Motors or generators with stationary armature and rotating excitation field

23/64 . Motors specially adapted for running on dc or ac by choice

23/66 . Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the machine, e.g. with impedance, with switch (control arrangements external to the machine H02P)

24/00 Machines adapted for the instantaneous transmission or reception of the angular displacement of rotating parts, e.g. synchro, selsyn

25/00 Dc interrupter motors or generators

26/00 Machines adapted to function as torque motors, i.e. to exert a torque when stalled

27/00 Ac commutator motors or generators having mechanical commutator (universal ac/dc motors H02K 23/64)

29/00 Motors or generators having non-mechanical commutating devices, e.g. discharge tubes, semiconductor devices

29/03 . with a magnetic circuit specially adapted for avoiding torque ripples or self-starting problems **[6]**

29/06 . with position sensing devices (H02K 29/03 takes precedence) **[4,6]**

29/14 . with speed sensing devices (H02K 29/03 takes precedence) **[4,6]**

31/00 Acyclic motors or generators, i.e. dc machines having a drum or disc armature with continuous current collectors

33/00 Motors with reciprocating, oscillating, or vibrating magnet, armature, or coil system (arrangements for handling mechanical energy structurally associated with motors H02K 7/00, e.g. H02K 7/06)

33/18 . with coil system moving upon intermittent or reversed energisation thereof by interaction with a fixed field system, e.g. permanent magnet

35/00 Generators with reciprocating, oscillating, or vibrating coil system, magnet, armature, or other part of the magnetic circuit (arrangements for handling mechanical energy structurally associated with generators H02K 7/00, e.g. H02K 7/06)

37/00 Motors with rotor rotating step by step and without interrupter or commutator driven by the rotor, e.g. stepping motors

37/02 . variable reluctance type **[4]**

37/10 . permanent magnet type (H02K 37/02 takes precedence) **[4]**

37/12 . . with stationary armature and rotating magnet **[4]**

39/00 Generators specially adapted for producing a desired non-sinusoidal waveform

41/00 Propulsion systems in which a rigid body is moved along a path due to dynamo-electric interaction between the body and a magnetic field travelling along the path

41/02 . Linear motors; Sectional motors **[3]**

41/025 . . Asynchronous motors **[3]**

41/03 . . Synchronous motors; Motors moving step by step; Reluctance motors (H02K 41/035 takes precedence) **[3]**

41/035 . . Dc motors; Unipolar motors **[3]**

44/00 Machines in which the dynamo-electric interaction between a plasma or flow of conductive liquid or of fluid-borne conductive or magnetic particles and a coil system or magnetic field converts energy of mass flow into electrical energy or vice versa [3]

47/00 Dynamo-electric converters

49/00 Dynamo-electric clutches; **Dynamo-electric brakes** (electrically or magnetically actuated clutches or brakes F16D 27/00, F16D 29/00, F16D 65/14; magnetic-particle clutches F16D 37/00; adapted for use as dynamometers G01L)

51/00 Dynamo-electric gears, i.e. dynamo-electric means for transmitting mechanical power from a driving shaft to a driven shaft and comprising structurally interrelated motor and generator parts

53/00 Alleged dynamo-electric perpetua mobilia

55/00 Dynamo-electric machines having windings operating at cryogenic temperatures [3]

57/00 Dynamo-electric machines not provided for in groups H02K 17/00 to H02K 55/00 [3]

H02M APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; **CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER**; **CONTROL OR REGULATION THEREOF** (conversion of current or voltage specially adapted for use in electronic time-pieces with no moving parts G04G 19/00; systems for regulating electric or magnetic variables in general, e.g. using transformers, reactors or choke coils, combination of such systems with static converters G05F; for digital computers G06F 1/00; transformers H01F; connection or control of one converter with regard to conjoint operation with a similar or other source of supply H02J; dynamo-electric converters H02K 47/00; controlling transformers, reactors or choke coils, control or regulation of electric motors, generators or dynamo-electric converters H02P; pulse generators H03K) **[4,5]**

Notes

(1) This subclass covers only circuits or apparatus for the conversion of electric power, or arrangements for control or regulation of such circuits or apparatus.

(2) This subclass does not cover the individual electro-technical devices employed when converting electric power. Such devices are covered by the relevant subclasses, e.g. inductors, transformers H01F, capacitors, electrolytic rectifiers H01G, mercury-vapour rectifying or other discharge tubes H01J, semiconductor devices H01L, impedance networks or resonant circuits not primarily concerned with the transfer of electric power H03H.

(3) In this subclass, the following term is used with the meaning indicated:
– "conversion", in respect of an electric variable, e.g. voltage or current, means the change of one or more of the parameters of the variable, e.g. amplitude, frequency, phase, polarity. **[4]**

Subclass Index

1/00 Details of apparatus for conversion

1/02 . Circuits specially adapted for the generation of grid-control or igniter-control voltages for discharge tubes incorporated in static converters

1/06 . Circuits specially adapted for rendering non-conductive gas discharge tubes or equivalent semiconductor devices, e.g. thyratrons, thyristors **[2]**

1/08 . Circuits specially adapted for the generation of control voltages for semiconductor devices incorporated in static converters

1/084 . . using a control circuit common to several phases of a multi-phase system **[4]**

1/088 . . for the simultaneous control of series or parallel connected semiconductor devices **[4]**

1/10 . Arrangements incorporating converting means for enabling loads to be operated at will from different kinds of power supplies, e.g. from ac or dc

1/12 . Arrangements for reducing harmonics from ac input or output

1/14 . Arrangements for reducing ripples from dc input or output

1/16 . Means for providing current step on switching, e.g. with saturable reactor

1/20 . Contact mechanisms of dynamic converters

3/00 Conversion of dc power input into dc power output

3/02 . without intermediate conversion into ac

3/04 . . by static converters

3/16 . . by dynamic converters

3/20 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters

3/22 . with intermediate conversion into ac

3/24 . . by static converters

3/34 . . by dynamic converters

3/44 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters

5/00 Conversion of ac power input into ac power output, e.g. for change of voltage, for change of frequency, for change of number of phases

5/02 . without intermediate conversion into dc

7/00 Conversion of ac power input into dc power output; Conversion of dc power input into ac power output

7/02 . Conversion of ac power input into dc power output without possibility of reversal

7/04 . . by static converters

7/06 . . . using discharge tubes without control electrode or semiconductor devices without control electrode

7/08 . . . . arranged for operation in parallel

7/10 . . . . arranged for operation in series, e.g. for multiplication of voltage

7/12 . . . using discharge tubes with control electrode or semiconductor devices with control electrode

7/21 . . . . using devices of a triode or transistor type requiring continuous application of a control signal **[2,4]**

7/217 . . . . . using semiconductor devices only **[2]**

7/219 . . . . . in a bridge configuration **[4]**

7/42 . Conversion of dc power input into ac power output without possibility of reversal

7/44 . . by static converters

7/48 . . . using discharge tubes with control electrode or semiconductor devices with control electrode

7/505 . . . . using devices of a thyratron or thyristor type requiring extinguishing means **[2]**

7/53 . . . . using devices of a triode or transistor type requiring continuous application of a control signal **[2]**

7/537 . . . . . using semiconductor devices only, e.g. single switched pulse inverters **[2]**

7/5375 . . . . . with special starting equipment **[4]**

7/538 . . . . . in a push-pull configuration (H02M 7/5375 takes precedence) **[4]**

7/5383 . . . . . in a self-oscillating arrangement (H02M 7/538 takes precedence) **[4]**

7/5387 . . . . . in a bridge configuration **[4]**

7/539 . . . . . with automatic control of output wave form or frequency (H02M 7/5375 to H02M 7/5387 take precedence) **[4]**

7/66 . with possibility of reversal

9/00 Conversion of dc or ac input power into surge output power [2]

11/00 Power conversion systems not covered by the other groups of this subclass [4]

H02N ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR

Notes

(1) This subclass covers:
- electrostatic generators, motors, clutches, or holding devices;
- other non-dynamo-electric generators or motors;
- holding or levitation devices using magnetic attraction or repulsion;
- arrangements for starting, regulating, braking, or otherwise controlling such machines unless in conjoint operation with a second machine.

(2) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

(3) Specific provision for generators, motors, or other means for converting between electric and other forms of energy also exists in other subclasses, e.g. in subclasses H01L, H01M, H02K, H04R.

Subclass Index

1/00 Electrostatic generators or motors using a solid moving electrostatic charge carrier

2/00 Electric machines in general using piezo-electric effect, electrostriction or magnetostriction (generating mechanical vibrations in general B06B; piezo-electric, electrostrictive or magnetostrictive elements in general H01L 41/00) **[4]**

2/02 . producing linear motion, e.g. actuators; Linear positioners **[6]**

2/10 . producing rotary motion, e.g. rotary motors **[6]**

2/18 . producing electrical output from mechanical input, e.g. generators (for measurement devices G01) **[6]**

3/00 Generators in which thermal or kinetic energy is converted into electrical energy by ionisation of a fluid and removal of the charge therefrom (discharge tubes functioning as thermionic generators H01J 45/00) **[3]**

6/00 **Generators in which light radiation is directly converted into electrical energy** (solar cells or assemblies thereof H01L 25/00, H01L 31/00) **[4]**

10/00 **Electric motors using thermal effects [3]**

11/00 **Generators or motors not provided for elsewhere**; **Alleged perpetua mobilia obtained by electric or magnetic means** (by hydrostatic pressure F03B 17/00; by dynamo-electric means H02K 53/00)

13/00 **Clutches or holding devices using electrostatic attraction, e.g. using Johnson-Rahbek effect**

15/00 **Holding or levitation devices using magnetic attraction or repulsion, not otherwise provided for** (electric or magnetic devices for holding work on machine tools B23Q 3/15; sliding or levitation devices for railway systems B61B 13/08; material handling devices associated with conveyers incorporating devices with electrostatic or magnetic grippers B65G 47/92; separating thin or filamentary articles from piles using magnetic force B65H 3/00; delivering thin or filamentary articles from magnetic holders by air blast or suction B65H 29/24; bearings using magnetic or electric supporting means F16C 32/04; relieving bearing loads using magnetic means F16C 39/00; magnets H01F 7/00; dynamo-electric clutches or brakes H02K 49/00) **[3]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

H02P **CONTROL OR REGULATION OF ELECTRIC MOTORS, GENERATORS, OR DYNAMO-ELECTRIC CONVERTERS**; **CONTROLLING TRANSFORMERS, REACTORS OR CHOKE COILS** (structure of the starter, brake, or other control devices, see the relevant subclasses, e.g. mechanical brake F16D, mechanical speed regulator G05D, variable resistor H01C, starter switch H01H; systems for regulating electric or magnetic variables using transformers, reactors or choke coils G05F; arrangements structurally associated with motors, generators, dynamo-electric converters, transformers, reactors or choke coils, see the relevant subclasses, e.g. H01F, H02K; connection or control of one generator, transformer, reactor, choke coil, or dynamo-electric converter with regard to conjoint operation with similar or other source of supply H02J; control or regulation of static converters H02M) **[4]**

Notes

(1) This subclass covers arrangements for starting, regulating, electronically commutating, braking, or otherwise controlling motors, generators, dynamo-electric converters, clutches, brakes, gears, transformers, reactors or choke coils, of the types classified in the relevant subclasses, e.g. H01F, H02K.

(2) This subclass does not cover similar arrangements for the apparatus of the types classified in subclass H02N, which arrangements are covered by that subclass.

(3) In this subclass, the following terms or expressions are used with the meanings indicated: **[6]**
- "control" means influencing a variable in any way, e.g. changing its direction or its value (including changing it to or from zero), maintaining it constant, limiting its range of variation; **[6]**
- "regulation" means maintaining a variable at a desired value, or within a desired range of values, by comparison of the actual value with the desired value. **[6]**

Subclass Index

1/00 **Arrangements for starting electric motors or dynamo-electric converters** (starting of synchronous motors with electronic commutators H02P 6/00; starting dynamo-electric motors rotating step by step H02P 8/04; vector control H02P 21/00) **[4,8]**

1/16 . for starting dynamo-electric motors or dynamo-electric converters

1/18 . . for starting an individual dc motor

1/26 . . for starting an individual polyphase induction motor

3/00 **Arrangements for stopping or slowing electric motors, generators, or dynamo-electric converters** (stopping of synchronous motors with electronic commutators H02P 6/00; stopping dynamo-electric motors rotating step by step H02P 8/24; vector control H02P 21/00) **[2,4,8]**

3/06 . for stopping or slowing an individual dynamo-electric motor or dynamo-electric converter **[2]**

3/18 . . for stopping or slowing an ac motor **[2]**

4/00 **Arrangements specially adapted for regulating or controlling the speed or torque of electric motors that can be connected to two or more different voltage or current supplies** (starting H02P 1/00; stopping or slowing H02P 3/00; vector control H02P 21/00) **[8]**

5/00 **Arrangements specially adapted for regulating or controlling the speed or torque of two or more electric motors** (starting H02P 1/00; stopping or slowing H02P 3/00; vector control H02P 21/00) **[1,8]**

5/46 . for speed regulation of two or more dynamo-electric motors in relation to one another

5/60 . controlling combinations of dc and ac dynamo-electric motors (H02P 5/46 takes precedence) **[8]**

5/68 . controlling two or more dc dynamo-electric motors (H02P 5/46, H02P 5/60 take precedence) **[8]**

5/74 . controlling two or more ac dynamo-electric motors (H02P 5/46, H02P 5/60 take precedence) **[8]**

6/00 **Arrangements for controlling synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position**; **Electronic commutators therefor** (stepping motors H02P 8/00; vector control H02P 21/00) **[3,4,6]**

6/08 . Arrangements for controlling the speed or torque of a single motor **[6]**

6/12 . Monitoring commutation; Providing indication of commutation failure **[6]**

6/14 . Electronic commutators **[6]**

7/00 **Arrangements for regulating or controlling the speed or torque of electric dc-motors** (starting H02P 1/00; stopping or slowing H02P 3/00; vector control H02P 21/00) **[2,8]**

7/06 . for regulating or controlling an individual dc dynamo-electric motor by varying field or armature current

7/18 . . by master control with auxiliary power

8/00 **Arrangements for controlling dynamo-electric motors rotating step by step** (vector control H02P 21/00) **[2,6,8]**

8/02 . specially adapted for single-phase or bi-pole stepper motors, e.g. watch-motors, clock-motors **[6]**

8/04 . Arrangements for starting **[6]**

8/12 . Control or stabilisation of current **[6]**

8/14 . Arrangements for controlling speed or speed and torque (H02P 8/12, H02P 8/22 take precedence) **[6]**

8/22 . Control of step size; Intermediate stepping, e.g. micro-stepping **[6]**

8/24 . Arrangements for stopping (H02P 8/32 take precedence) **[6]**

8/32 . Reducing overshoot or oscillation, e.g. damping **[6]**

8/34 . Monitoring operation (H02P 8/36 takes precedence) **[6]**

8/36 . Protection against faults, e.g. against overheating, step-out; Indicating faults (emergency protective arrangements with automatic interruption of supply H02H 7/08) **[6]**

8/40 . Special adaptations for controlling two or more stepping motors **[6]**

8/42 . characterised by non-stepper motors being operated step by step **[6]**

9/00 **Arrangements for controlling electric generators for the purpose of obtaining a desired output** (Ward-Leonard arrangements H02P 7/18; vector control H02P 21/00; feeding a network by two or more generators H02J; for charging batteries H02J 7/14) **[1,8]**

9/04 . Control effected upon non-electric prime mover and dependent upon electric output value of the generator (effecting control of the prime mover in general, see the relevant class for such prime mover) **[2]**

9/08 . Control of generator circuit during starting or stopping of driving means, e.g. for initiating excitation **[2]**

9/10 . Control effected upon generator excitation circuit to reduce harmful effects of overloads or transients, e.g. sudden application of load, sudden removal of load, sudden change of load **[2]**

9/14 . by variation of field (H02P 9/08, H02P 9/10 take precedence) **[2]**

11/00 **Arrangements for controlling dynamo-electric converters** (starting H02P 1/00; stopping or slowing H02P 3/00; vector control H02P 21/00; feeding a network in conjunction with a generator or another converter H02J) **[4,8]**

13/00 **Arrangements for controlling transformers, reactors or choke coils, for the purpose of obtaining a desired output** (regulation systems using transformers, reactors or choke coils G05F; transformers H01F; feeding a network in conjunction with a generator or a converter H02J; control or regulation of converters H02M) **[4]**

15/00 **Arrangements for controlling dynamo-electric brakes or clutches** (controlling speed of dynamo-electric motors by means of a separate brake H02P 29/04, vector control H02P 21/00) **[1,8]**

17/00 **Arrangements for controlling dynamo-electric gears** (vector control H02P 21/00) **[3,8]**

21/00 **Arrangements or methods for the control of electric machines by vector control, e.g. by control of field orientation [6,8]**

Note

When classifying in this group, it is desirable to also classify in groups H02P 25/00 to H02P 27/00 if the kind of ac-motor, structural details, or the kind of supply voltage are of interest. **[8]**

21/02 . specially adapted for optimising the efficiency at low load **[8]**

21/04 . specially adapted for very low speeds **[8]**

21/05 . specially adapted for damping motor oscillations, e.g. for reducing hunting **[8]**

21/06 . Rotor flux based control **[8]**

21/12 . Stator flux based control **[8]**

21/13 . Observer control, e.g. using Luenberger observers or Kalman filters **[8]**

21/14 . Estimation or adaptation of machine parameters, e.g. rotor time constant, flux, speed, current or voltage **[8]**

23/00 Arrangements or methods for the control of ac-motors characterised by a control method other than vector control (starting H02P 1/00; stopping or slowing H02P 3/00; of two or more motors H02P 5/00; of synchronous motors with electronic commutators H02P 6/00; of dc-motors H02P 7/00; of stepping motors H02P 8/00) **[8]**

Note

When classifying in this group, it is desirable to also classify in groups H02P 25/00 to H02P 27/00 if the kind of ac-motor, structural details, or the kind of supply voltage are of interest. **[8]**

23/02 . specially adapted for optimising the efficiency at low load **[8]**

23/03 . specially adapted for very low speeds **[8]**

23/04 . specially adapted for damping motor oscillations, e.g. for reducing hunting **[8]**

23/06 . Controlling the motor in four quadrants **[8]**

23/08 . Controlling based on slip frequency, e.g. adding slip frequency and speed proportional frequency **[8]**

23/10 . Controlling by adding a dc current (dc current braking H02P 3/18) **[8]**

23/12 . Observer control, e.g. using Luenberger observers or Kalman filters **[8]**

23/14 . Estimation or adaptation of motor parameters, e.g. rotor time constant, flux, speed, current or voltage **[8]**

25/00 Arrangements or methods for the control of ac-motors characterised by the kind of ac-motor or by structural details (starting H02P 1/00; stopping or slowing H02P 3/00; of two or more motors H02P 5/00; of synchronous motors with electronic commutators H02P 6/00; of dc-motors H02P 7/00; of stepping motors H02P 8/00) **[8]**

Note

When classifying in this group, it is desirable to also classify in groups H02P 21/00, H02P 23/00 or H02P 27/00 if the control method or the kind of supply voltage are of interest. **[8]**

25/02 . characterised by the kind of motor **[8]**

25/16 . characterised by the circuit arrangement or by the kind of wiring **[8]**

27/00 Arrangements or methods for the control of ac-motors characterised by the kind of supply voltage (starting H02P 1/00; stopping or slowing H02P 3/00; of two or more motors H02P 5/00; of synchronous motors with electronic commutators H02P 6/00; of dc-motors H02P 7/00; of stepping motors H02P 8/00) **[8]**

Note

When classifying in this group, it is desirable to also classify in groups H02P 21/00, H02P 23/00 or H02P 25/00 if the control method, the kind of the ac-motor or structural details are of interest. **[8]**

27/02 . using supply voltage with constant frequency and variable amplitude **[8]**

27/04 . using variable-frequency supply voltage, e.g. inverter or converter supply voltage **[8]**

29/00 Arrangements for regulating or controlling electric motors, appropriate for both ac- and dc-motors (starting H02P 1/00; stopping or slowing H02P 3/00; control of motors that can be connected to two or more different voltage or current supplies H02P 4/00; vector control H02P 21/00) **[8]**

29/02 . Providing protection against overload without automatic interruption of supply, e.g. monitoring **[8]**

29/04 . by means of a separate brake **[8]**

31/00 Arrangements for regulating or controlling electric motors not provided for in groups H02P 1/00 to H02P 5/00, H02P 7/00 or H02P 21/00 to H02P 29/00 [8]

H03 BASIC ELECTRONIC CIRCUITRY

H03B GENERATION OF OSCILLATIONS, DIRECTLY OR BY FREQUENCY-CHANGING, BY CIRCUITS EMPLOYING ACTIVE ELEMENTS WHICH OPERATE IN A NON-SWITCHING MANNER; GENERATION OF NOISE BY SUCH CIRCUITS (measuring, testing G01R; generators adapted for electrophonic musical instruments G10H; speech synthesis G10L 13/00; masers, lasers H01S; dynamo-electric machines H02K; power inverter circuits H02M; by using pulse techniques H03K; automatic control of generators H03L; starting, synchronisation or stabilisation of generators where the type of generator is irrelevant or unspecified H03L; generation of oscillations in plasma H05H)

Subclass Index

1/00 Details

5/00 Generation of oscillations using amplifier with regenerative feedback from output to input (H03B 9/00, H03B 15/00 take precedence)

5/08 . with frequency-determining element comprising lumped inductance and capacitance

5/18 . with frequency-determining element comprising distributed inductance and capacitance

5/30 . with frequency-determining element being electromechanical resonator

5/32 . . being a piezo-electric resonator (piezo-electric elements in general H01L 41/00)

5/34 . . . active element in amplifier being vacuum tube (H03B 5/38 takes precedence)

5/36 . . . active element in amplifier being semiconductor device (H03B 5/38 takes precedence)

5/38 . . . frequency-determining element being connected via bridge circuit to closed ring around which signal is transmitted

7/00 Generation of oscillations using active element having a negative resistance between two of its electrodes (H03B 9/00 takes precedence)

9/00 Generation of oscillations using transit-time effects [2]

11/00 Generation of oscillations using a shock-excited tuned circuit (with feedback H03B 5/00)

13/00 Generation of oscillations using deflection of electron beam in a cathode-ray tube

15/00 Generation of oscillations using galvano-magnetic devices, e.g. Hall-effect devices, or using super-conductivity effects (galvano-magnetic devices per se H01L 43/00)

17/00 Generation of oscillations using radiation source and detector, e.g. with interposed variable obturator

19/00 Generation of oscillations by non-regenerative frequency multiplication or division of a signal from a separate source (transference of modulation from one carrier to another H03D 7/00)

21/00 Generation of oscillations by combining unmodulated signals of different frequencies (H03B 19/00 takes precedence; frequency changing circuits in general H03D) **[3]**

23/00 Generation of oscillations periodically swept over a predetermined frequency range (angle-modulating circuits in general H03C 3/00)

25/00 Simultaneous generation by a free-running oscillator of oscillations having different frequencies

27/00 Generation of oscillations providing a plurality of outputs of the same frequency but differing in phase, other than merely two anti-phase outputs

28/00 Generation of oscillations by methods not covered by groups H03B 5/00 to H03B 27/00, including modification of the waveform to produce sinusoidal oscillations (analogue function generators for performing computing operations G06G 7/00; use of transformers for conversion of waveform in ac-ac converters H02M 5/02) **[4]**

29/00 Generation of noise currents and voltages

H03C **MODULATION** (measuring, testing G01R; masers, lasers H01S; modulators specially adapted for use in dc amplifiers H03F 3/38; modulating pulses H03K 7/00; so-called modulators capable only of switching between predetermined states of amplitude, frequency or phase H03K 17/00, H04L; coding, decoding or code conversion, in general H03M; synchronous modulators specially adapted for colour television H04N 9/65)

Notes

(1) This subclass covers only modulation, keying, or interruption of sinusoidal oscillations or electromagnetic waves, the modulating signal having any desired waveform.

(2) In this subclass, circuits usable both as modulator and demodulator are classified in the group dealing with the type of modulator involved.

1/00 **Amplitude modulation** (H03C 5/00, H03C 7/00 take precedence)

3/00 **Angle modulation** (H03C 5/00, H03C 7/00 take precedence)

5/00 **Amplitude modulation and angle modulation produced simultaneously or at will by the same modulating signal** (H03C 7/00 takes precedence)

7/00 **Modulating electromagnetic waves** (devices or arrangements for the modulation of light G02F 1/00; for generating oscillations H03B, H03K)

99/00 **Subject matter not provided for in other groups of this subclass [8]**

H03D **DEMODULATION OR TRANSFERENCE OF MODULATION FROM ONE CARRIER TO ANOTHER** (masers, lasers H01S; circuits capable of acting both as modulator and demodulator H03C; details applicable to both modulators and frequency-changers H03C; demodulating pulses H03K 9/00; transforming types of pulse modulation H03K 11/00; coding, decoding or code conversion, in general H03M; repeater stations H04B 7/14; demodulators adapted for digitally modulated-carrier systems H04L 27/00; synchronous demodulators adapted for colour television H04N 9/66)

Note

This subclass covers only:
- demodulation or transference of signals modulated on a sinusoidal carrier or on electromagnetic waves;
- comparing phase or frequency of two mutually-independent oscillations.

Subclass Index

1/00 **Demodulation of amplitude-modulated oscillations** (H03D 5/00, H03D 9/00, H03D 11/00 take precedence)

3/00 **Demodulation of angle-modulated oscillations** (H03D 5/00, H03D 9/00, H03D 11/00 take precedence)

5/00 **Circuits for demodulating amplitude-modulated or angle-modulated oscillations at will** (H03D 9/00, H03D 11/00 take precedence)

7/00 **Transference of modulation from one carrier to another, e.g. frequency-changing** (H03D 9/00, H03D 11/00 take precedence; dielectric amplifiers, magnetic amplifiers, parametric amplifiers used as frequency-changers H03F)

7/14 **.** Balanced arrangements

9/00 **Demodulation or transference of modulation of modulated electromagnetic waves** (devices or arrangements for demodulating light, transferring modulation in light waves G02F 2/00)

11/00 **Super-regenerative demodulator circuits**

13/00 **Circuits for comparing the phase or frequency of two mutually-independent oscillations**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

H03F **AMPLIFIERS** (measuring, testing G01R; optical parametric amplifiers G02F; circuit arrangements with secondary emission tubes H01J 43/00; masers, lasers H01S; dynamo-electric amplifiers H02K; control of amplification H03G; coupling arrangements independent of the nature of the amplifier, voltage dividers H03H; amplifiers capable only of dealing with pulses H03K; repeater circuits in transmission lines H04B 3/36, H04B 3/54; application of speech amplifiers in telephonic communication H04M 1/60, H04M 3/40)

Note

This subclass covers:
- linear amplification, there being linear relationship between the amplitudes of input and output, and the output having substantially the same waveform as the input;
- dielectric amplifiers, magnetic amplifiers, and parametric amplifiers when used as oscillators or frequency-changers;
- constructions of active elements of dielectric amplifiers and parametric amplifiers if no provision exists elsewhere.

Subclass Index

1/00 Details of amplifiers with only discharge tubes, only semiconductor devices or only unspecified devices as amplifying elements

1/02 . Modifications of amplifiers to raise the efficiency, e.g. gliding Class A stages, use of an auxiliary oscillation

1/08 . Modifications of amplifiers to reduce detrimental influences of internal impedances of amplifying elements (wide-band amplifiers with inter-stage coupling networks incorporating these impedances H03F 1/42; eliminating transit-time effects in vacuum tubes H01J 21/00)

1/26 . Modifications of amplifiers to reduce influence of noise generated by amplifying elements

1/30 . Modifications of amplifiers to reduce influence of variations of temperature or supply voltage

1/32 . Modifications of amplifiers to reduce non-linear distortion (by negative feedback H03F 1/34)

1/33 . . in discharge-tube amplifiers **[2]**

1/34 . Negative-feedback-circuit arrangements with or without positive feedback (H03F 1/02 to H03F 1/30, H03F 1/38 to H03F 1/42, H03F 3/50 take precedence) **[3]**

1/38 . Positive-feedback circuit arrangements without negative feedback

1/42 . Modifications of amplifiers to extend the bandwidth

1/52 . Circuit arrangements for protecting such amplifiers **[3]**

3/00 Amplifiers with only discharge tubes or only semiconductor devices as amplifying elements

Note

Groups H03F 3/20 to H03F 3/72 take precedence over groups H03F 3/02 to H03F 3/189. **[2]**

3/02 . with tubes only (subsequent subgroups take precedence)

3/04 . with semiconductor devices only (subsequent subgroups take precedence)

3/18 . with semiconductor devices of complementary types (subsequent subgroups take precedence)

3/181 . Low-frequency amplifiers, e.g. audio preamplifiers **[2]**

3/189 . High-frequency amplifiers, e.g. radio frequency amplifiers **[2]**

3/20 . Power amplifiers, e.g. Class B amplifiers, Class C amplifiers (H03F 3/26 to H03F 3/30 take precedence)

3/26 . Push-pull amplifiers; Phase-splitters therefor (duplicated single-ended push-pull arrangements or phase-splitters therefor H03F 3/30)

3/30 . Single-ended push-pull amplifiers; Phase-splitters therefor

3/34 . Dc amplifiers in which all stages are dc-coupled (H03F 3/45 takes precedence) **[3]**

3/343 . . with semiconductor devices only **[2]**

3/38 . Dc amplifiers with modulator at input and demodulator at output; Modulators or demodulators specially adapted for use in such amplifiers (modulators in general H03C; demodulators in general H03D; amplitude modulation of pulses in general H03K 7/00; amplitude demodulation of pulses in general H03K 9/00)

3/42 . Amplifiers with two or more amplifying elements having their dc paths in series with the load, the control electrode of each element being excited by at least part of the input signal, e.g. so-called totem-pole amplifiers

3/45 . Differential amplifiers **[2]**

3/46 . Reflex amplifiers

3/50 . Amplifiers in which input is applied to, or output is derived from, an impedance common to input and output circuits of the amplifying element, e.g. cathode follower

3/54 . Amplifiers using transit-time effect in tubes or semiconductor devices (parametric amplifiers H03F 7/00; solid state travelling-wave devices H01L 45/00)

3/60 . Amplifiers in which coupling networks have distributed constants, e.g. with waveguide resonators (H03F 3/54 takes precedence)

3/62 . Two-way amplifiers

3/66 . Amplifiers simultaneously generating oscillations of one frequency and amplifying signals of another frequency

3/68 . Combinations of amplifiers, e.g. multi-channel amplifiers for stereophonics
3/70 . Charge amplifiers **[2]**
3/72 . Gated amplifiers, i.e. amplifiers which are rendered operative or inoperative by means of a control signal **[2]**

5/00 Amplifiers with both discharge tubes and semiconductor devices as amplifying elements

7/00 Parametric amplifiers (devices or arrangements for the parametric generation or amplification of light, infra-red or ultra-violet waves G02F 1/35)

9/00 Magnetic amplifiers

11/00 Dielectric amplifiers

13/00 Amplifiers using amplifying element consisting of two mechanically- or acoustically-coupled transducers, e.g. telephone-microphone amplifier

15/00 Amplifiers using galvano-magnetic effects not involving mechanical movement, e.g. using Hall effect

17/00 Amplifiers using electroluminescent element or photocell

19/00 Amplifiers using superconductivity effects

99/00 Subject matter not provided for in other groups of this subclass **[2009.01]**

H03G CONTROL OF AMPLIFICATION (impedance networks, e.g. attenuators, H03H; control of transmission in lines H04B 3/04)

Notes

(1) This subclass covers:
– control of gain of amplifiers or frequency-changers;
– control of frequency range of amplifiers;
– limiting amplitude or rate of change of amplitude.
(2) Attention is drawn to the Note following the title of subclass H03F. **[3]**

Subclass Index

1/00 Details of arrangements for controlling amplification

3/00 Gain control in amplifiers or frequency changers (gated amplifiers H03F 3/72; peculiar to television receivers H04N)
3/02 . Manually-operated control
3/04 . . in untuned amplifiers
3/20 . Automatic control (combined with volume compression or expansion H03G 7/00)
3/22 . . in amplifiers having discharge tubes
3/30 . . in amplifiers having semiconductor devices
3/32 . . . the control being dependent upon ambient noise level or sound level
3/34 . . . Muting amplifier when no signal is present

5/00 Tone control or bandwidth control in amplifiers
5/16 . Automatic control

7/00 Volume compression or expansion in amplifiers

9/00 Combinations of two or more types of control, e.g. gain control and tone control

11/00 Limiting amplitude; **Limiting rate of change of amplitude**

99/00 Subject matter not provided for in other groups of this subclass [8]

H03H IMPEDANCE NETWORKS, E.G. RESONANT CIRCUITS; **RESONATORS** (measuring, testing G01R; arrangements for producing a reverberation or echo sound G10K 15/08; impedance networks or resonators consisting of distributed impedances, e.g. of the waveguide type, H01P; control of amplification, e.g. bandwidth control of amplifiers, H03G; tuning resonant circuits, e.g. tuning coupled resonant circuits, H03J; networks for modifying the frequency characteristics of communication systems H04B)

Notes

(1) This subclass covers:
– networks comprising lumped impedance elements;
– networks comprising distributed impedance elements together with lumped impedance elements;
– networks comprising electromechanical or electro-acoustic elements;
– networks simulating reactances and comprising discharge tubes or semiconductor devices;
– constructions of electromechanical resonators.

(2) In this subclass, the following expression is used with the meaning indicated:
– "passive elements" means resistors, capacitors, inductors, mutual inductors, or diodes. **[3]**

(3) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

(4) In this subclass, main groups with a higher number take precedence. **[3]**

Subclass Index

1/00 **Constructional details of impedance networks whose electrical mode of operation is not specified or applicable to more than one type of network** (constructional details of electromechanical transducers H03H 9/00)

2/00 **Networks using elements or techniques not provided for in groups H03H 3/00 to H03H 21/00 [3]**

3/00 **Apparatus or processes specially adapted for the manufacture of impedance networks, resonating circuits, resonators**

5/00 **One-port networks comprising only passive electrical elements as network components [3]**

7/00 **Multiple-port networks comprising only passive electrical elements as network components** (receiver input circuits H04B 1/18; networks simulating a length of communication cable H04B 3/02) **[3]**

7/01 . Frequency selective two-port networks **[3]**
7/075 . . Ladder networks, e.g. electric wave filters **[3]**
7/09 . . Filters comprising mutual inductance **[3]**
7/24 . Frequency-independent attenuators
7/30 . Time-delay networks
7/38 . Impedance-matching networks

9/00 **Networks comprising electromechanical or electro-acoustical elements**; **Electromechanical resonators** (manufacture of piezo-electric or magnetostrictive elements H01L 41/00; loudspeakers, microphones, gramophone pick-ups or the like H04R)

9/02 . Details **[3]**
9/05 . . Holders; Supports **[3]**
9/125 . . Driving means, e.g. electrodes, coils **[3]**
9/145 . . . for networks using surface acoustic waves **[3]**

11/00 **Networks using active elements**

11/02 . Multiple-port networks **[3]**
11/04 . . Frequency selective two-port networks **[3]**
11/26 . . Time-delay networks (analogue shift registers G11C 27/00) **[3]**

15/00 **Transversal filters** (electromechanical filters H03H 9/00) **[3]**

17/00 **Networks using digital techniques [3]**

17/02 . Frequency-selective networks **[3]**
17/04 . . Recursive filters **[3]**
17/06 . . Non-recursive filters **[3]**
17/08 . Networks for phase-shifting **[3]**

19/00 **Networks using time-varying elements, e.g. N-path filters [3]**

21/00 **Adaptive networks [3]**

H03J **TUNING RESONANT CIRCUITS**; **SELECTING RESONANT CIRCUITS** (indicating arrangements for measuring G01D; measuring, testing G01R; remote-control in general G05, G08; automatic control or stabilisation of generators H03L)

Note

This subclass covers also the control of tuning, including the combined control of tuning and other functions, e.g. combinations of tuning control and volume control, combinations of control of local oscillator and of supplementary resonant circuits. **[3]**

Subclass Index

1/00 **Details of adjusting, driving, indicating, or mechanical control arrangements for resonant circuits in general** (machine elements in general F16; coupling of knobs to shafts F16D) **[3]**

3/00 **Continuous tuning** (H03J 7/00, H03J 9/00 take precedence; combination of continuous and discontinuous tuning other than for bandspreading H03J 5/00) **[3]**

5/00 **Discontinuous tuning**; **Selecting predetermined frequencies**; **Selecting frequency bands with or without continuous tuning in one or more of the bands, e.g. push-button tuning, turret tuner** (H03J 7/00, H03J 9/00 take precedence; for bandspreading H03J 3/00) **[3]**

7/00 **Automatic frequency control**; **Automatic scanning over a band of frequencies [3]**

7/02 . Automatic frequency control (H03J 7/18 takes precedence; automatic tuning control for television receivers H04N 5/50) **[3]**

7/18 . Automatic scanning over a band of frequencies **[3]**

9/00 **Remote-control of tuned circuits**; **Combined remote-control of tuning and other functions, e.g. brightness, amplification** (mechanical remote-control arrangements H03J 1/00) **[3]**

H03K **PULSE TECHNIQUE** (measuring pulse characteristics G01R; mechanical counters having an electrical input G06M; information storage devices in general G11; sample-and-hold arrangements in electric analogue stores G11C 27/00; construction of switches involving contact making and breaking for generation of pulses, e.g. by using a moving magnet, H01H; static conversion of electric power H02M; generation of oscillations by circuits employing active elements which operate in a non-switching manner H03B; modulating sinusoidal oscillations with pulses H03C, H04L; discriminator circuits involving pulse counting H03D; automatic control of generators H03L; starting, synchronisation, or stabilisation of generators where the type of generator is irrelevant or unspecified H03L; coding, decoding or code conversion, in general H03M) **[4]**

Notes

(1) This subclass covers:
- methods, circuits, devices, or apparatus using active elements operating in a discontinuous or switching manner for generating, counting, amplifying, shaping, modulating, demodulating, or otherwise manipulating signals;
- electronic switching not involving contact-making and braking;
- logic circuits handling electric pulses.

(2) In this subclass, the following expression is used with the meaning indicated:
- "active element" exercises control over the conversion of input energy into an oscillation or a discontinuous flow of energy.

(3) In this subclass, where the claims of a patent document are not limited to a specific circuit element, the document is classified at least according to the elements used in the described embodiment. **[6]**

Subclass Index

3/00 **Circuits for generating electric pulses**; **Monostable, bistable or multistable circuits** (H03K 4/00 takes precedence; for digital computers G06F 1/02) **[5]**

4/00 **Generating pulses having essentially a finite slope or stepped portions** (generation of supply voltages from deflection waveforms H04N 3/18)

5/00 **Manipulating pulses not covered by one of the other main groups in this subclass** (circuits with regenerative action H03K 3/00, H03K 4/00; by the use of non-linear magnetic or dielectric devices H03K 3/00)

Note

In this group, the input signals are of the pulse type. **[3]**

5/003 . Changing the DC level (television signals H04N 3/00) **[6]**

5/007 . . Base line stabilisation (thresholding H03K 5/08) **[6]**

5/01 . Shaping pulses (discrimination against noise or interference H03K 5/125)

5/02 . . by amplifying (H03K 5/04 takes precedence; wide-band amplifiers in general H03F)

5/04 . . by increasing duration; by decreasing duration
5/08 . . by limiting, by thresholding, by slicing, i.e. combined limiting and thresholding (H03K 5/04 takes precedence; comparing one pulse with another H03K 5/22; providing a determined threshold for switching H03K 17/30) **[3]**
5/125 . Discriminating pulses (measuring or indicating G01R 19/00, G01R 23/00, G01R 25/00, G01R 29/00; separation of synchronising signals in television systems H04N 5/08) **[6]**
5/13 . Arrangements having a single output and transforming input signals into pulses delivered at desired time intervals
5/135 . . by the use of time reference signals, e.g. clock signals **[3]**
5/14 . . by the use of delay lines **[3]**
5/145 . . by the use of resonant circuits **[3]**
5/15 . Arrangements in which pulses are delivered at different times at several outputs, i.e. pulse distributors (distributing, switching, or gating arrangements H03K 17/00) **[2]**
5/153 . Arrangements in which a pulse is delivered at the instant when a predetermined characteristic of an input signal is present or at a fixed time interval after this instant (switching at zero crossing H03K 17/13)
5/156 . Arrangements in which a continuous pulse train is transformed into a train having a desired pattern
5/159 . Applications of delay lines not covered by the preceding subgroups
5/19 . Monitoring patterns of pulse trains (indicating amplitude G01R 19/00; indicating frequency G01R 23/00; measuring characteristics of individual pulses G01R 29/02) **[3]**
5/22 . Circuits having more than one input and one output for comparing pulses or pulse trains with each other according to input signal characteristics, e.g. slope, integral (indicating phase difference of two cyclic pulse trains G01R 25/00) **[3]**

6/00 Manipulating pulses having a finite slope and not covered by one of the other main groups of this subclass (circuits with regenerative action H03K 4/00)

Note

In this group, the input signals are of the pulse type. **[3]**

7/00 Modulating pulses with a continuously-variable modulating signal

9/00 Demodulating pulses which have been modulated with a continuously-variable signal

11/00 Transforming types of modulation, e.g. position-modulated pulses into duration-modulated pulses

12/00 Producing pulses by distorting or combining sinusoidal waveforms (shaping pulses H03K 5/01; combining sinewaves using elements operating in a non-switching manner H03B) **[3]**

17/00 Electronic switching or gating, i.e. not by contact-making and -breaking (selection of the stylus or auxiliary electrode in electric printing B41J 2/39; sample-and-hold arrangements G11C 27/00; switching or interrupting devices in waveguides H01P; gated amplifiers H03F 3/72; switching arrangements for exchange systems using static devices H04Q 3/52)

17/04 . Modifications for accelerating switching **[3]**
17/06 . Modifications for ensuring a fully conducting state **[3]**
17/08 . Modifications for protecting switching circuit against overcurrent or overvoltage **[3]**
17/082 . . by feedback from the output to the control circuit **[6]**
17/10 . Modifications for increasing the maximum permissible switched voltage **[3]**
17/12 . Modifications for increasing the maximum permissible switched current **[3]**
17/13 . Modifications for switching at zero crossing (generating an impulse at zero crossing H03K 5/153) **[3]**
17/14 . Modifications for compensating variations of physical values, e.g. of temperature **[3]**
17/16 . Modifications for eliminating interference voltages or currents **[3]**
17/18 . Modifications for indicating state of switch **[3]**
17/20 . Modifications for resetting core switching units to a predetermined state **[3]**
17/22 . Modifications for ensuring a predetermined initial state when the supply voltage has been applied (bi-stable generators H03K 3/00) **[3]**
17/26 . Modifications for temporary blocking after receipt of control pulses **[3]**
17/28 . Modifications for introducing a time delay before switching (modifications to provide a choice of time-intervals for executing more than one switching action H03K 17/296) **[3]**
17/296 . Modifications to provide a choice of time-intervals for executing more than one switching action and automatically terminating their operation after the programme is completed (electronic clocks comprising means to be operated at preselected times or after preselected time-intervals G04G 15/00) **[3]**
17/30 . Modifications for providing a predetermined threshold before switching (shaping pulses by thresholding H03K 5/08) **[3]**
17/51 . characterised by the use of specified components (H03K 17/04 to H03K 17/30, H03K 17/94 take precedence) **[3]**
17/56 . . by the use, as active elements, of semiconductor devices (using diodes H03K 17/51) **[3]**
17/60 . . . the devices being bipolar transistors (bipolar transistors having four or more electrodes H03K 17/72) **[3]**
17/62 . . . . Switching arrangements with several input- or output-terminals, e.g. multiplexers, distributors (logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00) **[3]**
17/687 . . . the devices being field-effect transistors **[3]**
17/689 . . . . with galvanic isolation between the control circuit and the output circuit (H03K 17/78 takes precedence) **[5]**
17/693 . . . . Switching arrangements with several input- or output-terminals, e.g. multiplexers, distributors (logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00) **[3]**
17/695 . . . . having inductive loads (protecting switching circuit against inductive flyback voltage H03K 17/08) **[6]**
17/72 . . . Bipolar semiconductor devices with more than two PN junctions, e.g. thyristors, programmable unijunction transistors, or with more than three electrodes, e.g. silicon controlled switches, or with more than one electrode connected to the same conductivity region, e.g. unijunction transistors **[3]**

17/78 . . by the use, as active elements, of opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled **[3]**
17/785 . . . controlling field-effect transistor switches **[5]**
17/79 . . . controlling semiconductor switches with more than two PN-junctions, or more than three electrodes, or more than one electrode connected to the same conductivity region **[5]**
17/795 . . . controlling bipolar transistors **[5]**
17/94 . characterised by the way in which the control signals are generated (mechanical structural details of control members of switches or keyboards, such as keys, push-buttons, levers or other mechanisms for transferring force to the activated elements, not directly producing electronic effects H01H; keyboards for special applications, see the relevant places, e.g. B41J, G06F 3/023, H04L 15/00, H04L 17/00, H04M 1/00) **[3,4]**

19/00 Logic circuits, i.e. having at least two inputs acting on one output (circuits for computer systems using fuzzy logic G06N 7/00); **Inverting circuits**
19/003 . Modifications for increasing the reliability **[3]**
19/007 . Fail-safe circuits **[3]**
19/01 . Modifications for accelerating switching **[3]**
19/0175 . Coupling arrangements; Interface arrangements (interface arrangements for digital computers G06F 3/00, G06F 13/00) **[5]**
19/018 . . using bipolar transistors only **[5]**
19/0185 . . using field-effect transistors only **[5]**
19/02 . using specified components (H03K 19/003 to H03K 19/0175 take precedence) **[3,5]**
19/08 . . using semiconductor devices (H03K 19/173 takes precedence; wherein the semiconductor devices are only diode rectifiers H03K 19/12) **[3]**
19/082 . . . using bipolar transistors **[3]**
19/086 . . . . Emitter coupled logic **[3]**
19/094 . . . using field-effect transistors **[3]**
19/0944 . . . . using MOSFET (H03K 19/096 takes precedence) **[5]**
19/0948 . . . . . using CMOS **[5]**
19/0952 . . . . using Schottky type FET (H03K 19/096 takes precedence) **[5]**
19/096 . . . . Synchronous circuits, i.e. using clock signals **[3]**
19/12 . . using diode rectifiers
19/173 . . using elementary logic circuits as components **[3]**
19/177 . . . arranged in matrix form **[3]**
19/20 . characterised by logic function, e.g. AND, OR, NOR, NOT circuits (H03K 19/003 to H03K 19/01 take precedence)

21/00 Details of pulse counters or frequency dividers

23/00 Pulse counters comprising counting chains; **Frequency dividers comprising counting chains** (H03K 29/00 takes precedence)

25/00 Pulse counters with step-by-step integration and static storage; **Analogous frequency dividers**

27/00 Pulse counters in which pulses are continuously circulated in a closed loop; **Analogous frequency dividers** (feedback shift register counters H03K 23/00) **[4]**

29/00 Pulse counters comprising multi-stable elements, e.g. for ternary scale, for decimal scale; **Analogous frequency dividers**

H03L AUTOMATIC CONTROL, STARTING, SYNCHRONISATION, OR STABILISATION OF GENERATORS OF ELECTRONIC OSCILLATIONS OR PULSES (of dynamo-electric generators H02P) **[3]**

Notes

(1) This subclass covers:
– automatic control circuits for generators of electronic oscillations or pulses; **[3]**
– starting, synchronisation, or stabilisation circuits for generators where the type of generator is irrelevant or unspecified. **[3]**
(2) This subclass does not cover stabilisation or starting circuits specially adapted to only one specific type of generator, which are covered by subclasses H03B, H03K. **[3]**
(3) In this subclass, the following expression is used with the meaning indicated:
– "automatic control" covers only closed loop systems. **[3]**

1/00 Stabilisation of generator output against variations of physical values, e.g. power supply (automatic control H03L 5/00, H03L 7/00) **[3]**

3/00 Starting of generators [3]

5/00 Automatic control of voltage, current, or power [3]

7/00 Automatic control of frequency or phase; **Synchronisation** (tuning of resonant circuits in general H03J; synchronising in digital communication systems, see the relevant groups in class H04) **[3]**
7/02 . using a frequency discriminator comprising a passive frequency-determining element **[3]**
7/06 . using a reference signal applied to a frequency- or phase-locked loop **[3]**
7/07 . . using several loops, e.g. for redundant clock signal generation (for indirect frequency synthesis H03L 7/16) **[5]**
7/08 . . Details of the phase-locked loop **[3]**
7/16 . . Indirect frequency synthesis, i.e. generating a desired one of a number of predetermined frequencies using a frequency- or phase-locked loop **[3]**
7/24 . using a reference signal directly applied to the generator **[3]**
7/26 . using energy levels of molecules, atoms, or subatomic particles as a frequency reference **[3]**

9/00 Automatic control not provided for in other groups of this subclass [8]

H03M **CODING, DECODING OR CODE CONVERSION, IN GENERAL** (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D, G01R, G06F, G06T, G09G, G10L, G11B, G11C, H04B, H04L, H04M, H04N; ciphering or deciphering for cryptography or other purposes involving the need for secrecy G09C) **[4]**

Subclass Index

1/00 **Analogue/digital conversion**; **Digital/analogue conversion** (conversion of analogue values to or from differential modulation H03M 3/00) **[4]**

1/02 . Reversible analogue/digital converters **[4]**

1/04 . using stochastic techniques **[4]**

1/06 . Continuously compensating for, or preventing, undesired influence of physical parameters (periodically H03M 1/10) **[4]**

1/08 . . of noise **[4]**

1/10 . Calibration or testing **[4]**

1/12 . Analogue/digital converters (H03M 1/02 to H03M 1/10 take precedence) **[4]**

1/14 . . Conversion in steps with each step involving the same or a different conversion means and delivering more than one bit **[4]**

1/18 . . Automatic control for modifying the range of signals the converter can handle, e.g. gain ranging **[4]**

1/20 . . Increasing resolution using an n bit system to obtain n + m bits, e.g. by dithering **[4]**

1/22 . . pattern-reading type **[4]**

1/34 . . Analogue value compared with reference values (H03M 1/48 takes precedence) **[4]**

1/36 . . . simultaneously only, i.e. parallel type **[4]**

1/38 . . . sequentially only, e.g. successive approximation type (converting more than one bit per step H03M 1/14) **[4]**

1/48 . . Servo-type converters **[4]**

1/50 . . with intermediate conversion to time interval (H03M 1/64 takes precedence) **[4]**

1/60 . . with intermediate conversion to frequency of pulses **[4]**

1/64 . . with intermediate conversion to phase of sinusoidal signals **[4]**

1/66 . Digital/analogue converters (H03M 1/02 to H03M 1/10 take precedence) **[4]**

1/68 . . with conversions of different sensitivity, i.e. one conversion relating to the more significant digital bits and another conversion to the less significant bits **[4]**

1/70 . . Automatic control for modifying converter range **[4]**

1/74 . . Simultaneous conversion **[4]**

1/82 . . with intermediate conversion to time interval **[4]**

3/00 **Conversion of analogue values to or from differential modulation [4]**

3/02 . Delta modulation, i.e. one-bit differential modulation **[4]**

5/00 **Conversion of the form of the representation of individual digits [4]**

7/00 **Conversion of a code where information is represented by a given sequence or number of digits to a code where the same information is represented by a different sequence or number of digits [4]**

Note

In groups H03M 7/02 to H03M 7/30, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[4]**

7/02 . Conversion to or from weighted codes, i.e. the weight given to a digit depending on the position of the digit within the block or code word **[4]**

7/14 . Conversion to or from non-weighted codes **[4]**

7/26 . Conversion to or from stochastic codes **[4]**

7/28 . Programmable structures, i.e. where the code converter contains apparatus which is operator-changeable to modify the conversion process **[4]**

7/30 . Compression (speech analysis-synthesis for redundancy reduction G10L 19/00; for image communication H04N); Expansion; Suppression of unnecessary data, e.g. redundancy reduction **[4]**

7/32 . . Conversion to or from delta modulation, i.e. one-bit differential modulation **[4]**

7/36 . . Conversion to or from differential modulation with several bits, i.e. the difference between successive samples being coded by more than one bit **[4]**

7/38 . . . adaptive **[4]**

7/40 . . Conversion to or from variable length codes, e.g. Shannon-Fano code, Huffman code, Morse code **[4]**

7/42 . . . using table look-up for the coding or decoding process, e.g. using read-only memory **[4]**

7/44 . . . Suppression of irrelevant zeroes **[4]**

7/46 . . Conversion to or from run-length codes, i.e. by representing the number of consecutive digits, or groups of digits, of the same kind by a code word and a digit indicative of that kind **[4]**

7/50 . . Conversion to or from non-linear codes, e.g. companding **[4]**

9/00 **Parallel/series conversion or vice versa** (digital stores in which the information is moved stepwise G11C 19/00) **[4]**

11/00 **Coding in connection with keyboards or like devices, i.e. coding of the position of operated keys** (keyboard switch arrangements, structural association of coders and keyboards H01H 13/70, H03K 17/94) **[4]**

11/02 . Details **[5]**

11/04 . . Coding of multifunction keys **[5]**

11/06 . . . by operating the multifunction key itself in different ways **[5]**

11/14 . . . by using additional keys, e.g. shift keys, which determine the function performed by the multifunction key **[5]**

13/00 **Coding, decoding or code conversion, for error detection or error correction**; **Coding theory basic assumptions**; **Coding bounds**; **Error probability evaluation methods**; **Channel models**; **Simulation or testing of codes** (error detection or error correction for analogue/digital, digital/analogue or code conversion H03M 1/00 to H03M 11/00; specially adapted for digital computers G06F 11/08, for information storage based on relative movement between record carrier and transducer G11B, e.g. G11B 20/18, for static stores G11C) **[4,7]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

H04 ELECTRIC COMMUNICATION TECHNIQUE

Note

This class covers electrical communication systems with propagation paths employing beams of corpuscular radiation, acoustic waves or electromagnetic waves, e.g. radio or optical communication. **[4]**

H04B **TRANSMISSION** (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communication H04K; transmission of digital information H04L; wireless communication networks H04W) **[4]**

Note

This subclass covers the transmission of information-carrying signals, the transmission being independent of the nature of the information, and includes monitoring and testing arrangements and the suppression and limitation of noise and interference.

Subclass Index

1/00 **Details of transmission systems, not covered by a single one of groups H04B 3/00 to H04B 13/00**; **Details of transmission systems not characterised by the medium used for transmission** (tuning resonant circuits H03J) **[4]**

1/02 . Transmitters (spatial arrangements of component circuits in radio pills for living beings A61B 5/07)

1/04 . . Circuits (of television transmitters H04N 5/38)

1/06 . Receivers (control of amplification H03G; television receivers H04N 5/44, H04N 5/64)

1/08 . . Constructional details, e.g. cabinet

1/10 . . Means associated with receiver for limiting or suppressing noise or interference

1/12 . . . Neutralising, balancing, or compensation arrangements

1/14 . . . Automatic detuning arrangements

1/16 . . Circuits

1/18 . . . Input circuits, e.g. for coupling to an aerial or a transmission line (input circuits for amplifiers in general H03F; coupling networks between aerials or lines and receivers independent of the nature of the receiver H03H)

1/20 . . . for coupling gramophone pick-up, recorder output, or microphone to receiver

1/22 . . . for receivers in which no local oscillation is generated

1/26 . . . for superheterodyne receivers (multiple frequency-changing H03D 7/00)

1/28 . . . . the receiver comprising at least one semiconductor device having three or more electrodes

1/30 . . . for homodyne or synchrodyne receivers (demodulator circuits H03D 1/00)

1/38 . Transceivers, i.e. devices in which transmitter and receiver form a structural unit and in which at least one part is used for functions of transmitting and receiving

1/40 . . Circuits

1/44 . . . Transmit/receive switching (in radar systems G01S; tubes therefor H01J 17/64; waveguide switches H01P 1/10) **[2]**

1/50 . . . using different frequencies for the two directions of communication

1/54 . . . using the same frequency for both directions of communication (H04B 1/44 takes precedence)

1/59 . Responders; Transponders (relay systems H04B 7/14)

1/62 . for providing a predistortion of the signal in the transmitter and corresponding correction in the receiver, e.g. for improving the signal/noise ratio

1/66 . for reducing bandwidth of signals (in speech analysis-synthesis techniques G10L 19/00; in pictorial communication systems H04N); for improving efficiency of transmission (H04B 1/68 takes precedence)

1/68 . for wholly or partially suppressing the carrier or one side band **[4]**

1/69 . Spread spectrum techniques in general (for code multiplex systems H04J 13/02) **[6]**

1/707 . . using direct sequence modulation **[6]**

1/74 . for increasing reliability, e.g. using redundant or spare channels or apparatus **[3]**

3/00 **Line transmission systems** (combined with near-field transmission systems H04B 5/00; constructional features of cables H01B 11/00)

3/02 . Details

3/04 . . Control of transmission; Equalising (control of amplification in general H03G)

3/06 . . . by the transmitted signal

3/20 . . Reducing echo effects or singing; Opening or closing transmitting path; Conditioning for transmission in one direction or the other

3/23 . . . using a replica of transmitted signal in the time domain, e.g. echo cancellers **[3]**

3/36 . . Repeater circuits (H04B 3/54 takes precedence; amplifiers therefor H03F)

3/46 . . Monitoring; Testing

3/48 . . . Testing attenuation

3/54 . Systems for transmission <u>via</u> power distribution lines (in alarm signalling systems G08B 25/01; remote indication of power network conditions, remote control of switching means in a power distribution network H02J 13/00)

5/00 Near-field transmission systems, e.g. inductive loop type

5/02 . using transceiver

5/04 . Calling systems, e.g. paging system

7/00 Radio transmission systems, i.e. using radiation field (H04B 10/00, H04B 15/00 take precedence)

7/005 . Control of transmission; Equalising **[3]**

7/01 . Reducing phase shift **[3]**

7/015 . Reducing echo effects **[3]**

7/02 . Diversity systems (for direction finding G01S 3/02; aerial arrays or systems H01Q)

7/04 . . using a plurality of spaced independent aerials

7/08 . . . at receiving station

7/14 . Relay systems (interrogator-responder radar systems G01S 13/00) **[2]**

7/145 . . Passive relay systems **[2]**

7/15 . . Active relay systems **[2]**

7/155 . . . Ground-based stations (H04B 7/204 takes precedence) **[2,5]**

7/185 . . . Space-based or airborne stations (H04B 7/204 takes precedence) **[2,5]**

7/19 . . . . Earth-synchronous stations **[2]**

7/195 . . . . Non-synchronous stations **[2]**

7/204 . . . Multiple access **[5]**

7/212 . . . . Time-division multiple access **[5]**

7/22 . Scatter propagation systems

7/24 . for communication between two or more posts (wireless communication networks H04W) **[2]**

7/26 . . at least one of which is mobile **[2]**

10/00 Transmission systems employing beams of corpuscular radiation, or electromagnetic waves other than radio waves, e.g. light, infra-red (optical coupling, mixing or splitting G02B; light guides G02B 6/00; switching, modulation, demodulation of light beams G02B, G02F; devices or arrangements for the control, e.g. modulation, of light beams G02F 1/00; devices or arrangements for demodulating light, transferring the modulation or changing the frequency of light G02F 2/00; optical multiplex systems H04J 14/00) **[5]**

10/02 . Details **[5]**

10/04 . . Transmitters **[5]**

10/06 . . Receivers **[5]**

10/08 . . Equipment for monitoring, testing or fault measuring **[5]**

10/10 . Transmission through free space, e.g. through the atmosphere (H04B 10/22, H04B 10/24, H04B 10/30 take precedence) **[5,7]**

10/105 . . specially adapted for satellite links **[6]**

10/12 . Transmission through light guides, e.g. optical fibres (H04B 10/22, H04B 10/24, H04B 10/30 take precedence) **[5,7]**

10/13 . . using multimodal transmission **[6]**

10/135 . . using single mode transmission **[6]**

10/14 . . Terminal stations **[5]**

10/142 . . . Coherent homodyne or heterodyne systems **[6]**

10/152 . . . Non-coherent direct-detection systems **[6]**

10/16 . . Repeaters **[5]**

10/17 . . . in which processing or amplification is carried out without conversion of the signal from optical form **[6]**

10/18 . . Arrangements for reducing or eliminating distortion or dispersion, e.g. equalisers **[5]**

10/20 . . Arrangements for networking, e.g. bus or star coupling **[5]**

10/207 . . . using a star-type coupler **[6]**

10/213 . . . using a T-type coupler **[6]**

10/22 . Transmission between two stations which are mobile relative to each other (H04B 10/30 takes precedence) **[5,7]**

10/24 . Bidirectional transmission (H04B 10/22, H04B 10/30 take precedence) **[5,7]**

10/26 . . using a single light source for both stations involved **[6]**

10/28 . . using a single device as a light source or a light receiver **[6]**

10/30 . Transmission systems employing beams of corpuscular radiation (arrangements for handling beams of corpuscular radiation, e.g. focusing, moderating, G21K 1/00) **[7]**

11/00 Transmission systems employing ultrasonic, sonic or infrasonic waves

13/00 Transmission systems characterised by the medium used for transmission, not provided for in groups H04B 3/00 to H04B 11/00

14/00 Transmission systems not characterised by the medium used for transmission (details thereof H04B 1/00) **[4]**

14/02 . characterised by the use of pulse modulation (in radio transmission relays H04B 7/155) **[4]**

14/04 . . using pulse code modulation (analogue/digital or digital/analogue conversion H03M 1/00) **[4]**

15/00 Suppression or limitation of noise or interference (by means associated with receiver H04B 1/10)

15/02 . Reducing interference from electric apparatus by means located at or near the interfering apparatus (structural association with dynamo-electric machines H02K 11/00; screening H05K 9/00)

17/00 Monitoring; **Testing [2]**

17/02 . of relay systems **[2]**

H04H BROADCAST COMMUNICATION (multiplex communication H04J; pictorial communication aspects of broadcast systems H04N)

<u>Notes</u>

(1) In this subclass, the following terms or expressions are used with the meaning indicated:
– *"broadcast" is simultaneous distribution of identical signals to plural receiving stations. The term "broadcast" does not include distribution to receiving stations which is controlled by requests or responses from the receiving stations;* **[2009.01]**

– *"broadcast information" covers all kinds of information distributed by broadcast systems;* **[2009.01]**
– *"broadcast-related information" is information required by services provided via broadcast systems, other than broadcast information;* **[2009.01]**
– *"broadcast time" is a time when particular broadcast information exists and is available;* **[2009.01]**
– *"broadcast channel" is a channel via which broadcast information is distributed, e.g. carrier waves, time slots, cables or wireless broadcast service areas;* **[2009.01]**
– *"broadcast space" is either a set of broadcast channels in which particular broadcast information exists and is available or a geographical area determined by the set of broadcast channels;* **[2009.01]**
– *"broadcast space-time" is space-time determined by broadcast space and broadcast time in which particular broadcast information exists and is available;* **[2009.01]**
– *"broadcast system" is a system which consists of transmitter, transponder and receiver for broadcast;* **[2009.01]**
– *"broadcast-related system" is a system which is directly affected by generation, broadcast, reception or use of broadcast information;* **[2009.01]**
– *"broadcast service" is a service directly provided by a broadcast system, i.e. distribution service of broadcast information;* **[2009.01]**
– *"broadcast-related service" is a service provided by broadcast-related systems;* **[2009.01]**
– *"A with a direct linkage to B" means that A directly affects B or that A is directly affected by B.* **[2009.01]**

(2) *In this subclass, multi-aspect classification is applied, so that subject matter characterised by aspects covered by more than one of its groups, which is considered to represent information of interest for search, may also be classified in each of those groups.* **[2009.01]**

20/00 ***Arrangements for broadcast or for distribution combined with broadcast*** **[2009.01]**

20/02 . *Arrangements for relaying broadcast information* **[2009.01]**

20/10 . *Arrangements for replacing or switching information during the broadcast or during the distribution* **[2009.01]**

20/12 . *Arrangements for monitoring, testing or troubleshooting* **[2009.01]**

20/16 . *Arrangements for broadcast or distribution of identical information repeatedly* **[2009.01]**

20/18 . *Arrangements for synchronising broadcast or distribution via plural systems* **[2009.01]**

20/20 . *Arrangements for broadcast or distribution of identical information via plural systems* **[2009.01]**

20/26 . *Arrangements for switching distribution systems* **[2009.01]**

20/28 . *Arrangements for simultaneous broadcast of plural pieces of information* **[2009.01]**

20/38 . *Arrangements for distribution where lower stations, e.g. receivers, interact with the broadcast* **[2009.01]**

20/40 . *Arrangements for broadcast specially adapted for accumulation-type receivers* **[2009.01]**

20/42 . *Arrangements for resource management* **[2009.01]**

20/44 . *Arrangements characterised by circuits or components specially adapted for broadcast* **[2009.01]**

20/53 . *Arrangements specially adapted for specific applications, e.g. for traffic information or for mobile receivers* **[2009.01]**

20/65 . *Arrangements characterised by transmission systems for broadcast* **[2009.01]**

20/67 . . *Common-wave systems, i.e. using separate transmitters operating on substantially the same frequency* **[2009.01]**

20/76 . . *Wired systems* **[2009.01]**

20/77 . . . *using carrier waves* **[2009.01]**

20/86 . *Arrangements characterised by special technical features of the broadcast information, e.g. signal form or information format* **[2009.01]**

20/88 . . *Stereophonic broadcast systems* **[2009.01]**

40/00 ***Arrangements specially adapted for receiving broadcast information*** **[2009.01]**

40/09 . *Arrangements for receiving desired information automatically according to timetables* **[2009.01]**

40/18 . *Arrangements characterised by circuits or components specially adapted for receiving* **[2009.01]**

60/00 ***Arrangements for broadcast applications with a direct linkage to broadcast information or to broadcast space-time; Broadcast-related systems*** **[2009.01]**

60/02 . *Arrangements for generating broadcast information; Arrangements for generating broadcast-related information with a direct linkage to broadcast information or to broadcast space-time; Arrangements for simultaneous generation of broadcast information and broadcast-related information* **[2009.01]**

60/04 . . *Studio equipment; Interconnection of studios* **[2009.01]**

60/09 . *Arrangements for device control with a direct linkage to broadcast information or to broadcast space-time; Arrangements for control of broadcast-related services* **[2009.01]**

60/25 . *Arrangements for updating broadcast information or broadcast-related information* **[2009.01]**

60/27 . *Arrangements for recording or accumulating broadcast information or broadcast-related information* **[2009.01]**

60/29 . *Arrangements for monitoring broadcast services or broadcast-related services* **[2009.01]**

60/31 . . *Arrangements for monitoring the use made of the broadcast services* **[2009.01]**

60/35 . *Arrangements for identifying or recognising characteristics with a direct linkage to broadcast information or to broadcast space-time, e.g. for identifying broadcast stations or for identifying users* **[2009.01]**

60/56 . *Arrangements characterised by components specially adapted for monitoring, identification or recognition covered by groups H04H 60/29 or H04H 60/35* **[2009.01]**

60/61 . *Arrangements for services using the result of monitoring, identification or recognition covered by groups H04H 60/29 or H04H 60/35* **[2009.01]**

60/68 . *Systems specially adapted for using specific information, e.g. geographical or meteorological information* **[2009.01]**

60/76 . *Arrangements characterised by transmission systems other than for broadcast, e.g. the Internet* **[2009.01]**

H04J **MULTIPLEX COMMUNICATION** (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereophonic systems H04S)

Note

This subclass covers:
- circuits or apparatus for combining or dividing signals for the purpose of transmitting them simultaneously or sequentially over the same transmission path;
- monitoring arrangements therefor.

1/00 **Frequency-division multiplex systems** (H04J 14/00 takes precedence) **[5]**

3/00 **Time-division multiplex systems** (H04J 14/00 takes precedence; relay systems H04B 7/14; selecting techniques H04Q) **[4,5]**

3/02 . Details (electronic switching or gating H03K 17/00)

3/04 . . Distributors combined with modulators or demodulators

3/06 . . Synchronising arrangements

3/07 . . . using pulse stuffing for systems with different or fluctuating information rates **[3]**

3/08 . . Intermediate station arrangements, e.g. for branching, for tapping-off

3/12 . . Arrangements providing for calling or supervisory signals

3/14 . . Monitoring arrangements

3/16 . in which the time allocation to individual channels within a transmission cycle is variable, e.g. to accommodate varying complexity of signals, to vary number of channels transmitted (H04J 3/17, H04J 3/24 take precedence) **[4]**

3/17 . in which the transmission channel allotted to a first user may be taken away and re-allotted to a second user if the first user becomes inactive, e.g. TASI **[4]**

3/18 . using frequency compression and subsequent expansion of the individual signals

3/20 . using resonant transfer **[2]**

3/22 . in which the sources have different rates or codes **[4]**

3/24 . in which the allocation is indicated by an address (H04J 3/17 takes precedence; in computers G06F 12/00, G06F 13/00) **[4]**

3/26 . . in which the information and the address are simultaneously transmitted **[4]**

4/00 **Combined time-division and frequency-division multiplex systems** (H04J 13/00 takes precedence) **[2]**

7/00 **Multiplex systems in which the amplitudes or durations of the signals in individual channels are characteristic of those channels**

9/00 **Multiplex systems in which each channel is represented by a different type of modulation of the carrier**

11/00 **Orthogonal multiplex systems** (H04J 13/00 takes precedence) **[2]**

13/00 **Code multiplex systems [2]**

13/02 . using spread spectrum techniques **[6]**

14/00 **Optical multiplex systems** (optical coupling, mixing or splitting, per se G02B) **[5]**

14/02 . Wavelength-division multiplex systems **[5]**

14/04 . Mode multiplex systems **[5]**

14/06 . Polarisation multiplex systems **[5]**

14/08 . Time-division multiplex systems **[5]**

99/00 ***Subject matter not provided for in other groups of this subclass*** **[2009.01]**

H04K **SECRET COMMUNICATION**; **JAMMING OF COMMUNICATION**

Note

In this subclass, the following expression is used with the meaning indicated:
- "secret communication" includes secret line and radiation transmission systems, i.e. those in which apparatus at the transmitting station modifies the signal in such a way that the information cannot be intelligibly received without corresponding modifying apparatus at the receiving station.

1/00 **Secret communication** (ciphering or deciphering apparatus per se G09C; systems with reduced bandwidth or suppressed carrier H04B 1/66; spread spectrum techniques in general H04B 1/69; by using a sub-carrier H04B 14/00; by multiplexing H04J; transmission systems for secret digital information H04L 9/00; secret or subscription television systems H04N 7/16)

1/02 . by adding a second signal to make the desired signal unintelligible

1/04 . by frequency scrambling, i.e. by transposing or inverting parts of the frequency band or by inverting the whole band

1/06 . by transmitting the information or elements thereof at unnatural speeds or in jumbled order or backwards

1/08 . by varying the polarisation of transmitted waves

1/10 . by using two signals transmitted simultaneously or successively

3/00 **Jamming of communication**; **Counter-measures** (counter-measures used in radar or analogous systems G01S 7/00)

H04L **TRANSMISSION OF DIGITAL INFORMATION, E.G. TELEGRAPHIC COMMUNICATION** (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; coding, decoding or code conversion, in general H03M; arrangements common to telegraphic and telephonic communication H04M; selecting H04Q; wireless communication networks H04W) **[4]**

Note

This subclass covers transmission of signals having been supplied in digital form and includes data transmission, telegraphic communication, or methods or arrangements for monitoring.

Subclass Index

1/00 **Arrangements for detecting or preventing errors in the information received** (correcting synchronisation H04L 7/00; arrangements in the transmission path H04B)

1/02 . by diversity reception (in general H04B 7/02)

1/08 . by repeating transmission, e.g. Verdan system

1/12 . by using return channel

1/16 . . in which the return channel carries supervisory signals, e.g. repetition request signals

1/20 . using signal-quality detector **[3]**

1/22 . using redundant apparatus to increase reliability **[3]**

1/24 . Testing correct operation **[3]**

5/00 **Arrangements affording multiple use of the transmission path** (multiplex communication in general H04J)

5/02 . Channels characterised by the type of signal

5/14 . Two-way operation using the same type of signal, i.e. duplex (conditioning for two-way transmission in general H04B 3/20)

5/16 . . Half-duplex systems; Simplex/duplex switching; Transmission of break signals

7/00 **Arrangements for synchronising receiver with transmitter**

7/02 . Speed or phase control by the received code signals, the signals containing no special synchronisation information

7/027 . . extracting the synchronising or clock signal from the received signal spectrum, e.g. by using a resonant or bandpass circuit **[5]**

7/033 . . using the transitions of the received signal to control the phase of the synchronising-signal-generating means, e.g. using a phase-locked loop **[5]**

7/04 . Speed or phase control by synchronisation signals

7/08 . . the synchronisation signals recurring cyclically

7/10 . . Arrangements for initial synchronisation

9/00 **Arrangements for secret or secure communication** (spread spectrum techniques in general H04B 1/69)

Note

In group H04L 9/06 to H04L 9/32, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**

9/06 . the encryption apparatus using shift registers or memories for blockwise coding, e.g. D.E.S. systems **[5]**

9/08 . . Key distribution **[5]**

9/10 . with particular housing, physical features or manual controls **[5]**

9/12 . Transmitting and receiving encryption devices synchronised or initially set up in a particular manner **[5]**

9/14 . using a plurality of keys or algorithms **[5]**

9/18 . Encryption by serially and continuously modifying data stream elements, e.g. stream cipher systems **[5]**
9/28 . using particular encryption algorithm **[5]**
9/32 . including means for verifying the identity or authority of a user of the system (security arrangements for protecting computers or computer systems against unauthorised activity G06F 21/00; dispensing apparatus actuated by coded identity card or credit card G07F 7/08; specially adapted for wireless communication networks H04W 12/00) **[5]**
9/34 . Bits, or blocks of bits, of the telegraphic message being interchanged in time **[5]**
9/36 . with means for detecting characters not meant for transmission **[5]**
9/38 . Encryption being effected by mechanical apparatus, e.g. rotating cams, switches, keytape punchers **[5]**

12/00 Data switching networks (interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units G06F 13/00) **[5]**
12/02 . Details **[5]**
12/04 . . Switchboards **[5]**
12/06 . . Answer-back mechanisms or circuits **[5]**
12/08 . . Allotting numbers to messages; Counting characters, words or messages **[5]**
12/10 . . Current supply arrangements **[5]**
12/12 . . Arrangements for remote connection or disconnection of substations or of equipment thereof **[5]**
12/14 . . Charging arrangements **[5]**
12/16 . . Arrangements for providing special services to substations **[5]**
12/18 . . . for broadcast or conference **[5]**
12/22 . . Arrangements for preventing the taking of data from a data transmission channel without authorisation (means for verifying the identity or the authority of a user of a secure or secret communication system H04L 9/32) **[5]**
12/24 . . Arrangements for maintenance or administration **[5]**
12/26 . . Monitoring arrangements; Testing arrangements **[5]**
12/28 . characterised by path configuration, e.g. LAN [Local Area Networks] or WAN [Wide Area Networks] (wireless communication networks H04W) **[5,6]**
12/40 . . Bus networks **[5,6]**
12/403 . . . with centralised control, e.g. polling **[6]**
12/407 . . . with decentralised control **[6]**
12/42 . . Loop networks **[5,6]**
12/423 . . . with centralised control, e.g. polling **[6]**
12/427 . . . with decentralised control **[6]**
12/437 . . . Ring fault isolation or reconfiguration **[6]**
12/44 . . Star or tree networks **[5,6]**
12/46 . . Interconnection of networks **[5,6]**
12/50 . Circuit switching systems, i.e. systems in which the path is physically permanent during the communication **[5,6]**
12/54 . Stored and forward switching systems **[5,6]**
12/56 . . Packet switching systems **[5,6]**
12/58 . . Message switching systems (permutation- code selecting H04Q 3/02) **[5,6]**
12/60 . . . Manual relay systems, e.g. push-button switching **[5,6]**
12/64 . Hybrid switching systems **[5,6]**
12/66 . Arrangements for connecting between networks having differing types of switching systems, e.g. gateways **[5,6]**

13/00 Details of the apparatus or circuits covered by groups H04L 15/00 or H04L 17/00
13/02 . Details not particular to receiver or transmitter
13/08 . . Intermediate storage means

15/00 Apparatus or local circuits for transmitting or receiving dot-and-dash codes, e.g. Morse code (teaching apparatus therefor G09B; keyboard switches in general H01H 13/70, H03K 17/94; telegraph tapping keys H01H 21/00; coding in connection with keyboards or like devices, in general H03M 11/00)

17/00 Apparatus or local circuits for transmitting or receiving codes wherein each character is represented by the same number of equal-length code elements, e.g. Baudot code (keyboard switches in general H01H 13/70, H03K 17/94; coding in connection with keyboards or like devices, in general H03M 11/00)

19/00 Apparatus or local circuits for step-by-step systems

21/00 Apparatus or local circuits for mosaic printer telegraph systems

23/00 Apparatus or local circuits for systems other than those covered by groups H04L 15/00 to H04L 21/00

25/00 Baseband systems
25/02 . Details (circuits in general for handling pulses H03K; in line transmission systems in general H04B 3/02)
25/03 . . Shaping networks in transmitter or receiver, e.g. adaptive shaping networks (impedance networks per se H03H) **[2]**
25/04 . . . Passive shaping networks **[2]**
25/06 . . Dc level restoring means; Bias distortion correction
25/08 . . Modifications for reducing interference; Modifications for reducing effects due to line faults
25/10 . . Compensating for variations in line balance
25/12 . . Compensating for variations in line impedance
25/14 . . Channel dividing arrangements
25/17 . . Interpolating arrangements **[4]**
25/18 . . Arrangements for inductively generating telegraphic signals (induction coil interrupters H01H 51/00; dynamo-electric generators H02K)
25/20 . . Repeater circuits; Relay circuits
25/30 . Non-synchronous systems
25/38 . Synchronous or start-stop systems, e.g. for Baudot code
25/40 . . Transmitting circuits; Receiving circuits (repeater circuits, relay circuits H04L 25/38)
25/49 . . . using code conversion at the transmitter; using predistortion; using insertion of idle bits for obtaining a desired frequency spectrum; using three or more amplitude levels **[2]**
25/493 . . . . by transition coding, i.e. the time-position or direction of a transition being encoded before transmission **[3]**
25/497 . . . . by correlative coding, e.g. partial response coding or echo modulation coding **[3]**

27/00 Modulated-carrier systems
27/01 . Equalisers **[5]**

27/02 . Amplitude-modulated carrier systems, e.g. using on/off keying; Single sideband or vestigial sideband modulation (H04L 27/32 takes precedence) **[2,5]**

27/06 . . Demodulator circuits (in general H03D); Receiver circuits

27/10 . Frequency-modulated carrier systems, i.e. using frequency-shift keying (H04L 27/32 takes precedence) **[5]**

27/14 . . Demodulator circuits (in general H03D); Receiver circuits

27/144 . . . with demodulation using spectral properties of the received signal, e.g. by using frequency selective- or frequency sensitive elements **[6]**

27/156 . . . with demodulation using temporal properties of the received signal, e.g. detecting pulse width **[6]**

27/18 . Phase-modulated carrier systems, i.e. using phase-shift keying (H04L 27/32 takes precedence) **[5]**

27/20 . . Modulator circuits (in general H03C); Transmitter circuits

27/22 . . Demodulator circuits (in general H03D); Receiver circuits

27/227 . . . using coherent demodulation **[6]**

27/233 . . . using non-coherent demodulation **[6]**

27/26 . Systems using multi-frequency codes (H04L 27/32 takes precedence) **[5]**

27/32 . Carrier systems characterised by combinations of two or more of the types covered by groups H04L 27/02, H04L 27/10, H04L 27/18, or H04L 27/26 **[5]**

27/34 . . Amplitude- and phase-modulated carrier systems, e.g. quadrature-amplitude modulated carrier systems **[5]**

27/38 . . . Demodulator circuits; Receiver circuits **[5]**

29/00 Arrangements, apparatus, circuits or systems, not covered by a single one of groups H04L 1/00 to H04L 27/00 (interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units G06F 13/00) **[5]**

29/02 . Communication control; Communication processing (H04L 29/12, H04L 29/14 take precedence) **[5]**

29/04 . . for plural communication lines **[5]**

29/06 . . characterised by a protocol **[5]**

29/08 . . . Transmission control procedure, e.g. data link level control procedure **[5]**

29/10 . . characterised by an interface, e.g. the interface between the data link level and the physical level **[5]**

29/12 . characterised by the data terminal **[5]**

29/14 . Counter-measures to a fault **[5]**

H04M TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission between switching centres H04J; selecting arrangements H04Q; loudspeakers, microphones, gramophone pick-ups or like electromechanical transducers H04R; wireless communication networks H04W)

Notes

(1) This subclass covers:
- telephonic communication systems combined with other electrical systems;
- testing arrangements peculiar to telephonic communication systems.

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
- "subscriber" is a general term for terminal equipment, e.g. telephone for public use;
- "substation" means a subscriber or monitoring equipment which may connect a single subscriber to a line without choice as to subscriber;
- "satellite" is a type of exchange the operation of which depends upon control signals received from a supervisory exchange;
- "switching centres" includes exchanges and satellites.

Subclass Index

1/00 Substation equipment, e.g. for use by subscribers (subscriber services or facilities provided at exchanges H04M 3/00; prepayment telephone coin boxes H04M 17/00; current supply arrangements H04M 19/08; keyboard switches in general H01H 13/70, H03K 17/94) **[1,7]**

1/02 . Constructional features of telephone sets

1/03 . . Constructional features of telephone transmitters or receivers, e.g. telephone hand-sets (transducers in general H04R 1/00) **[2]**

1/04 . . Supports for telephone transmitters or receivers (for transducers in general H04R 1/00)

1/11 . . Supports for sets, e.g. incorporating armrests

1/15 . . Protection or guiding telephone cords (devices specially adapted or mounted for storing and repeatedly paying-out and restoring lengths of material B65H 75/34; in general H02G 11/00) **[5]**

1/17 . . Hygienic or sanitary devices on telephone equipment (for mouthpieces or earpieces H04R 1/12) **[2]**

1/18 . . Telephone sets modified for use in ships, mines, or other places exposed to adverse environment (H04M 1/19 takes precedence; telephone cabinets E04H 1/14)

1/19 . . Arrangements of transmitters, receivers, or complete sets to prevent eavesdropping, to attenuate local noise or to prevent undesired transmission; Special mouthpieces or receivers therefor (circuit arrangements for preventing eavesdropping H04M 1/68; telephone cabinets E04H 1/14)

1/20 . . Arrangements for preventing acoustic feedback (H04M 1/62 takes precedence)

1/21 . . Combinations with auxiliary equipment, e.g. with clock, with memoranda pad

1/22 . . Illuminating; Arrangements for improving visibility of characters on dials

1/23 . . Construction or mounting of dials or of equivalent devices; Means for facilitating the use thereof (by improving visibility H04M 1/22)

1/24 . Arrangements for testing (measuring electric values G01R; testing transducers H04R 29/00)

1/247 . Telephone sets including user guidance or feature selection means facilitating their use **[7]**

1/253 . Telephone sets using digital voice transmission (simultaneous speech and data transmission H04M 11/06) **[7]**

1/26 . Devices for calling a subscriber (H04M 1/66 takes precedence; coding in connection with keyboards or like devices, in general H03M 11/00) **[1,7]**

1/27 . . Devices whereby a plurality of signals may be stored simultaneously **[2]**

1/272 . . . with provision for storing only one subscriber number at a time, e.g. by keyboard or dial **[2]**

1/274 . . . with provision for storing more than one subscriber number at a time, e.g. using toothed disc **[2]**

1/276 . . . . using magnetic recording, e.g. on tape **[2]**

1/278 . . . . using punched cards or tapes **[2]**

1/56 . Arrangements for indicating or recording the called number at the calling subscriber's set

1/57 . Arrangements for indicating or recording the number of the calling subscriber at the called subscriber's set (at the operator set in a manual exchange H04M 5/00) **[2]**

1/58 . Anti-side-tone circuits (hybrid circuits for carrier-frequency operation H04B 1/00)

1/60 . including speech amplifiers

1/62 . . Constructional arrangements

1/64 . Automatic arrangements for answering calls; Automatic arrangements for recording messages for absent subscribers; Arrangements for recording conversations (centralised dictation systems H04M 11/10) **[1,7]**

1/65 . . Recording arrangements **[2,7]**

1/66 . with means for preventing unauthorised or fraudulent calling (verifying user identity or authority in secret or secure digital communications H04L 9/32) **[1,7]**

1/68 . Circuit arrangements for preventing eavesdropping

1/72 . Substation extension arrangements; Cordless telephones, i.e. devices for establishing wireless links to base stations without route selecting **[1,7]**

1/738 . Interface circuits for coupling substations to external telephone lines (H04M 1/78 takes precedence) **[7]**

1/78 . Circuit arrangements in which low-frequency speech signals proceed in one direction on the line, while speech signals proceeding in the other direction on the line are modulated on a high-frequency carrier signal (repeater circuits H04B 3/36) **[2]**

1/80 . Telephone line holding circuits **[7]**

1/82 . Line monitoring circuits for call progress or status discrimination **[7]**

3/00 Automatic or semi-automatic exchanges

3/02 . Ringing or otherwise calling substations (selective calling H04Q)

3/08 . Indicating faults in circuits or apparatus

3/16 . with lock-out or secrecy provision in party-line systems

3/18 . with means for reducing interference; with means for reducing effects due to line faults

3/20 . with means for interrupting existing connections; with means for breaking-in on conversations

3/22 . Supervisory, monitoring, or testing arrangements

3/24 . . with provision for checking the normal operation

3/26 . . with means for applying test signals

3/28 . . . Automatic routine testing

3/36 . . Statistical metering, e.g. recording occasions when traffic exceeds capacity of trunks (digital computers for evaluating statistical data G06F 17/18)

3/38 . Graded-service arrangements, i.e. some subscribers prevented from establishing certain connections (queuing arrangements H04Q 3/64)

3/40 . Applications of speech amplifiers

3/42 . Systems providing special services or facilities to subscribers (specially adapted for wireless communication networks H04W 4/00)

3/424 . . Arrangements for automatic redialling (at the subscriber's set H04M 1/27) **[7]**

3/44 . . Additional connecting arrangements for providing access to frequently-wanted subscribers, e.g. abbreviated dialling (at the subscriber's set H04M 1/27; automatic redialling H04M 3/424) **[1,7]**

3/46 . . Arrangements for calling a number of substations in a predetermined sequence until an answer is obtained

3/48 . . Arrangements for recalling a calling subscriber when the wanted subscriber ceases to be busy

3/487 . . Arrangements for providing information services, e.g. recorded voice services, time announcement **[7]**

3/50 . . Centralised arrangements for answering calls; Centralised arrangements for recording messages for absent or busy subscribers (H04M 3/487 takes precedence; centralised dictation systems H04M 11/10) **[1,7]**

3/54 . . Arrangements for diverting calls for one subscriber to another predetermined subscriber

3/56 . . Arrangements for connecting several subscribers to a common circuit, i.e. affording conference facilities (video conference systems H04N 7/15)

3/58 . . Arrangements for transferring received calls from one subscriber to another; Arrangements affording interim conversations between either the calling or the called party and a third party (substation line holding circuits H04M 1/80) **[1,7]**

3/60 . Semi-automatic systems, i.e. in which the numerical selection of the outgoing line is under the control of an operator

5/00 **Manual exchanges** (substation equipment in general H04M 1/00)

7/00 **Interconnection arrangements between switching centres** (transmission arrangements in general H04B)

7/02 . for compensating differences of ground potential
7/04 . for compensating differences of line impedance
7/06 . using auxiliary connections for control or supervision
7/08 . for phantom working
7/10 . for two-way working, i.e. calls may be set-up in either direction over the same connection
7/12 . for working between exchanges having different types of switching equipment, e.g. power-driven and step by step, decimal and non-decimal
7/14 . in systems involving main and subordinate switching centres (current supply source at subordinate switching centre charged from main exchange H04M 19/00)
7/16 . in systems employing carrier frequencies

9/00 **Interconnection arrangements not involving centralised switching**

9/02 . involving a common line for all parties
9/04 . involving a separate line for each pair of parties
9/06 . involving combinations of interconnecting lines
9/08 . Two-way loud-speaking telephone systems with means for suppressing echoes or otherwise conditioning for one or other direction of traffic (for line transmission in general H04B 3/20)

11/00 **Telephonic communication systems adapted for combination with other electrical systems**

11/02 . with bell or annunciator systems (such systems in general G08)
11/04 . with fire, police, burglar, or other alarm systems (such systems in general G08)
11/06 . Simultaneous speech and telegraphic or other data transmission over the same conductors (transmission of digital information in general H04L)
11/08 . adapted for optional reception of entertainment or informative matter (systems in which the information is continuously available on a carrier over the whole network H04H 20/77)
11/10 . with dictation recording and playback systems (such systems in general G11B)

13/00 **Party-line systems** (substation equipment H04M 1/00; exchange equipment H04M 3/00, H04M 5/00; metering arrangements H04M 15/36)

15/00 **Metering arrangements**; **Time-controlling arrangements**; **Time-indicating arrangements**

15/02 . Severing connection after predetermined time
15/04 . Recording calls in printed, perforated, or other permanent form
15/08 . Metering calls to called party
15/10 . Metering calls from calling party
15/28 . with meter at substation
15/32 . Metering arrangements for satellites or concentrators which connect one or more exchange lines with a group of local lines
15/34 . Metering arrangements for private branch exchanges
15/36 . Metering arrangements for party-lines
15/38 . Metering by apparatus not of the mechanical step-by-step counter type

17/00 **Prepayment telephone systems** (using a coded card to authorise calls from a telephone set H04M 1/66) **[1,7]**

19/00 **Current supply arrangements for telephone systems** (for selecting equipment H04Q 1/18)

19/08 . Current supply source at substation (battery saving arrangements for cordless telephones H04M 1/72; generating ringing current H04M 19/00) **[1,7]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

H04N **PICTORIAL COMMUNICATION, E.G. TELEVISION** (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G11B; coding, decoding or code conversion, in general H03M; broadcast distribution or the recording of use made thereof H04H) **[4]**

Notes

(1) This subclass covers:
- transmission of pictures or their transient or permanent reproduction either locally or remotely, by methods involving both the following steps:
  step (a): the scanning of a picture, i.e. resolving the whole picture-containing area into individual picture-elements and the derivation of picture-representative electric signals related thereto, simultaneously or in sequence;
  step (b): the reproduction of the whole picture-containing area by the reproduction of individual picture-elements into which the picture is resolved by means of picture-representative electric signals derived therefrom, simultaneously or in sequence; **[4]**
- (in group H04N 1/00) systems for the transmission or the reproduction of arbitrarily composed pictures or patterns in which the local light variations composing a picture are not subject to variation with time, e.g. documents (both written and printed), maps, charts, photographs (other than cinematograph films);
- circuits specially designed for dealing with pictorial communication signals, e.g. television signals, as distinct from merely signals of a particular frequency range.

(2) This subclass does not cover:
- circuits or other parts of systems which form the subject of other subclasses, which are covered by the corresponding subclasses, e.g. H03C, H03F, H03J, H04B, H04H;
- systems in which legible alphanumeric or like character forms are analysed according to step (a) of Note (1) to derive an electric signal from which the character is recognised by comparison with stored information, which are covered by subclass G06K;
- systems for the direct photographic copying of an original picture in which an electric signal representative of the picture is derived according to the said step (a) and employed to modify the operation of the system, e.g. to control exposure, which are covered by class G03;

– systems for the reproduction according to step (b) of Note (1) of pictures comprising alphanumeric or like character forms but involving the production of the equivalent of a signal which would be derived according to the above-mentioned step (a), e.g. by cams, punched card or tape, coded control signal, or other means, which are covered by the subclass for the application, e.g. G01D, G06T, H04L;
– systems for the reproduction according to the above-mentioned step (b) of pictures comprising alphanumeric or like character forms and involving the generation according to the above-mentioned step (a) of picture-representative electric signals from a pre-arranged assembly of such characters, or records thereof, forming an integral part of the systems, which are covered by the subclass for the application, e.g. B41B, G06K, subject to those applications which are covered by this subclass;
– printing, duplication or marking processes, or materials therefor, which are covered by the relevant subclasses, e.g. B41C, B41J, B41M, G03C, G03F, G03G. **[4]**

(3) In this subclass, the following expression is used with the meaning indicated:
– "television systems" means those systems for the transmission and reproduction of arbitrarily composed pictures in which the local light variations composing a picture may change with time, e.g. natural "live" scenes, recordings of such scenes such as cinematograph films.

1/00 Scanning, transmission or reproduction of documents or the like, e.g. facsimile transmission; Details thereof [3,4]

1/024 . Details of scanning heads **[3,4]**
1/028 . . for picture-information pick-up **[3,4]**
1/029 . . . Heads optically focused on only one picture element at a time **[6]**
1/03 . . . with photodetectors arranged in a substantially linear array (scanning of linear arrays H04N 1/19) **[6]**
1/032 . . for picture-information reproduction (engraving heads for the manufacture of printing formes B41C 1/02) **[3,4]**
1/036 . . . for optical reproduction **[3,4]**
1/04 . Scanning arrangements (H04N 1/387 takes precedence) **[4]**
1/047 . . Detection, control or error compensation of scanning velocity or position (H04N 1/17 takes precedence) **[6]**
1/06 . . using cylindrical picture-bearing surfaces **[4]**
1/10 . . using flat picture-bearing surfaces **[4]**
1/107 . . . with manual scanning **[6]**
1/113 . . using oscillating or rotating mirrors **[6]**
1/12 . . using the sheet-feed movement as the slow scanning component (using multi-element arrays H04N 1/19) **[4,6]**
1/17 . . the scanning speed being dependent on content of picture **[3,4]**
1/19 . . using multi-element arrays **[6]**
1/191 . . . the array comprising a one-dimensional array **[6]**
1/195 . . . the array comprising a two-dimensional array **[6]**
1/203 . . Simultaneous scanning of two or more separate pictures **[6]**
1/207 . . Simultaneous scanning of the original picture and the reproduced picture with a common scanning device **[6]**
1/21 . Intermediate information storage (H04N 1/387, H04N 1/41 take precedence; information storage in general G11) **[4]**
1/23 . Reproducing arrangements (details of scanning heads H04N 1/024; scanning arrangements therefor H04N 1/04) **[4]**
1/27 . . involving production of a magnetic intermediate picture **[4]**
1/29 . . involving production of an electrostatic intermediate picture **[4]**
1/31 . . Mechanical arrangements for picture transmission, e.g. adaptation of clutches, gearing, gear transmissions **[4]**
1/32 . Circuits or arrangements for control or supervision between transmitter and receiver
1/327 . . Initiating, continuing or ending a single-mode communication; Handshaking therefor **[6]**
1/333 . . Mode signalling or mode changing; Handshaking therefor **[6]**
1/34 . . for coin-freed systems
1/36 . . for synchronising or phasing transmitter and receiver
1/38 . Circuits or arrangements for blanking or otherwise eliminating unwanted parts of pictures (H04N 1/387 takes precedence) **[4]**
1/387 . Composing, repositioning or otherwise modifying originals (photoelectronic composing of characters B41B 19/00) **[4]**
1/393 . . Enlarging or reducing **[4]**
1/40 . Picture signal circuits (H04N 1/387 takes precedence) **[4]**
1/401 . . Compensating positionaly unequal response of the pick-up or reproducing head (H04N 1/403 takes precedence) **[6]**
1/403 . . Discrimination between the two tones in the picture signal of a two-tone original (shaping pulses by limiting or thresholding, in general H03K 5/08) **[6]**
1/405 . . Halftoning, i.e. converting the picture signal of a continuous-tone original into a corresponding signal showing only two levels **[6]**
1/407 . . Control or modification of tonal gradation or of extreme levels, e.g. background level **[6]**
1/409 . . Edge or detail enhancement; Noise or error suppression **[6]**
1/41 . Bandwidth or redundancy reduction (by scanning H04N 1/17) **[3]**
1/411 . . for the transmission or reproduction of two-tone pictures, e.g. black and white pictures **[4]**
1/413 . . . Systems or arrangements allowing the picture to be reproduced without loss or modification of picture-information **[4]**
1/415 . . . . in which the picture-elements are subdivided or grouped into fixed one-dimensional or two-dimensional blocks **[4]**
1/417 . . . . using predictive or differential encoding **[4]**
1/419 . . . . in which encoding of the length of a succession of picture-elements of the same value along a scanning line is the only encoding step **[4]**
1/42 . Systems for two-way working
1/44 . Secrecy systems
1/46 . Colour picture communication systems

1/48 . . Picture signal generators (for halftone screening H04N 1/52) **[6]**
1/50 . . Picture reproducers (for halftone screening H04N 1/52) **[6]**
1/52 . . Circuits or arrangements for halftone screening **[6]**
1/54 . . Conversion of colour picture signals to a plurality of signals some of which represent particular mixed colours, e.g. for textile printing **[6]**
1/56 . . Processing of colour picture signals (H04N 1/52 takes precedence) **[6]**
1/60 . . . Colour correction or control **[6]**
1/62 . . . . Retouching, i.e. modification of isolated colours only or in isolated picture areas only **[6]**
1/64 . . Systems for the transmission or the storage of the colour picture signal; Details therefor, e.g. coding or decoding means therefor **[6]**

3/00 Scanning details of television systems; **Combination thereof with generation of supply voltages [4]**
3/02 . by optical-mechanical means only (H04N 3/36 takes precedence; optical scanning systems in general G02B 26/10) **[2]**
3/10 . by means not exclusively optical-mechanical (H04N 3/36 takes precedence; devices or arrangements for the electro-, magneto- or acousto-optical modulation or deflection of light beams G02F) **[2]**
3/14 . . by means of electrically scanned solid-state devices
3/15 . . . for picture signal generation **[3]**
3/16 . . by deflecting electron beam in cathode-ray tube (producing sawtooth waveforms H03K 4/00)
3/18 . . . Generation of supply voltages, in combination with electron beam deflecting **[4]**
3/22 . . . Circuits for controlling dimensions, shape or centering of picture on screen
3/24 . . . Blanking circuits
3/26 . . . Modifications of scanning arrangements to improve focusing (focusing circuits in general H01J)
3/27 . . . Circuits special to multi-standard receivers (circuitry of multi-standard receivers in general H04N 5/46) **[3,4]**
3/36 . Scanning of motion picture films, e.g. for telecine **[2]**

5/00 Details of television systems (scanning details or combination thereof with generation of supply voltages H04N 3/00; specially adapted for colour television H04N 9/00) **[4]**
5/04 . Synchronising (for television systems using pulse code modulation H04N 7/24; in general H03L 7/00) **[4]**
5/06 . . Generation of synchronising signals
5/067 . . . Arrangements or circuits at the transmitter end **[4]**
5/08 . . Separation of synchronising signals from picture signals
5/12 . . Devices in which the synchronising signals are only operative if a phase difference occurs between synchronising and synchronised scanning devices, e.g. flywheel synchronising **[2]**
5/14 . Picture signal circuitry for video frequency region (H04N 5/222 takes precedence) **[2]**
5/16 . . Circuitry for reinsertion of dc and slowly varying components of signal; Circuitry for preservation of black or white level
5/18 . . . by means of "clamp" circuit operated by switching circuit
5/20 . . Circuitry for controlling amplitude response
5/202 . . . Gamma control **[4]**
5/205 . . . for correcting amplitude versus frequency characteristic **[4]**
5/208 . . . . for compensating for attenuation of high frequency components, e.g. crispening, aperture distortion correction **[4]**
5/21 . . Circuitry for suppressing or minimising disturbance, e.g. moire, halo (suppression of noise in television recording H04N 5/911)
5/213 . . . Circuitry for suppressing or minimising impulsive noise (H04N 5/217 takes precedence) **[4]**
5/217 . . . in picture signal generation **[4]**
5/222 . Studio circuitry; Studio devices; Studio equipment **[4]**
5/225 . . Television cameras **[4]**
5/228 . . . Circuit details for pick-up tubes **[4]**
5/232 . . . Devices for controlling television cameras, e.g. remote control (H04N 5/235 takes precedence; control of exposure in cameras by setting shutters, diaphragms or filters separately or conjointly G03B 7/00; focusing for cameras G03B 13/00; varying magnification for cameras G03B 17/00) **[4]**
5/235 . . . Circuitry for compensating for variation in the brightness of the object **[4]**
5/238 . . . . by influencing optical part of the camera **[4]**
5/243 . . . . by influencing the picture signal **[4]**
5/247 . . . Arrangement of television cameras **[4]**
5/253 . . Picture signal generating by scanning motion picture films or slide opaques, e.g. for telecine (scanning details therefor H04N 3/36) **[4]**
5/257 . . Picture signal generators using flying-spot scanners (H04N 5/253 takes precedence) **[4]**
5/262 . . Studio circuits, e.g. for mixing, switching-over, change of character of image, other special effects **[4]**
5/265 . . . Mixing **[4]**
5/268 . . . Signal distribution or switching (for broadcasting H04H 20/00) **[4]**
5/272 . . . Means for inserting a foreground image in a background image, i.e. inlay, outlay **[4]**
5/278 . . . Subtitling **[4]**
5/28 . . Mobile studios
5/30 . Transforming light or analogous information into electric information (H04N 5/222 takes precedence; scanning details H04N 3/00; transforming acoustic waves into electric information G01S 7/52, G01S 15/00; light transforming elements H01J, H01L) **[2,4,7]**
5/32 . . Transforming X-rays
5/321 . . . with video transmission of fluoroscopic images **[5]**
5/33 . . Transforming infra-red radiation **[2]**
5/335 . . using electrically scanned solid-state devices (H04N 5/32, H04N 5/33 take precedence) **[4]**
5/38 . Transmitter circuitry (H04N 5/14 takes precedence) **[4]**
5/44 . Receiver circuitry (H04N 5/14 takes precedence) **[4]**
5/445 . . for displaying additional information (H04N 5/50 takes precedence) **[4]**
5/45 . . . Picture in picture **[4]**
5/455 . . Demodulation-circuits (demodulation in general H03D) **[4]**

5/46 . . for receiving on more than one standard at will (deflecting circuits of multi-standard receivers H04N 3/27) **[4]**
5/50 . . Tuning indicators; Automatic tuning control (tuning control in general H03J) **[4]**
5/52 . . Automatic gain control **[4]**
5/57 . . Control of contrast or brightness **[4]**
5/60 . . for the sound signals
5/62 . . . Intercarrier circuits, i.e. heterodyning sound and vision carriers
5/63 . Generation or supply of power specially adapted for television receivers (generation of supply voltages in combination with electron beam deflecting H04N 3/18; regulating of voltage or current in general G05F; transformers H01F; supplying or distributing electric power, in general H02J; static converters H02M) **[4]**
5/64 . Constructional details of receivers, e.g. cabinets, dust covers (furniture aspects A47B, e.g. A47B 81/00) **[2]**
5/645 . . Mounting of picture tube on chassis or in housing
5/65 . . Holding-devices for protective discs or for picture masks
5/655 . . Construction or mounting of chassis, e.g. for varying the elevation of the tube
5/66 . Transforming electric information into light information (scanning details H04N 3/00)
5/68 . . Circuit details for cathode-ray display tubes
5/70 . . Circuit details for electroluminescent devices
5/72 . Modifying the appearance of television pictures by optical filters or diffusing screens (optical filters or diffusing screens per se G02B 5/00)
5/74 . Projection arrangements for image reproduction, e.g. using eidophor (optical systems in general G02B)
5/76 . Television signal recording (diagnosis, testing or measuring of television signal recorders H04N 17/06; recording in connection with measuring G01D; information storage in general G11, e.g. G11B) **[3,4]**
5/765 . . Interface circuits between an apparatus for recording and another apparatus (associated working of recording or reproducing apparatus with a television camera or receiver in which the television signal is not significantly involved G11B 31/00) **[6]**
5/77 . . . between a recording apparatus and a television camera **[6]**
5/775 . . . between a recording apparatus and a television receiver **[6]**
5/78 . . using magnetic recording (H04N 5/91 takes precedence) **[3]**
5/781 . . . on discs or drums **[3]**
5/782 . . . on tape **[3]**
5/7822 . . . . with stationary magnetic heads **[6]**
5/7824 . . . . with rotating magnetic heads **[6]**
5/783 . . . . Adaptations for reproducing at a rate different from the recording rate **[3]**
5/80 . . using electrostatic recording (H04N 5/91 takes precedence) **[3]**
5/84 . . using optical recording (H04N 5/80, H04N 5/89, H04N 5/91 take precedence) **[3,4]**
5/89 . . using holographic recording (H04N 5/91 take precedence) **[3]**
5/903 . . using variable electrical capacitive recording (H04N 5/91 takes precedence) **[4]**
5/907 . . using static stores, e.g. storage tubes, semiconductor memories (H04N 5/91 takes precedence; based on relative movement between record carrier and transducer H04N 5/78 to H04N 5/903) **[4]**
5/91 . . Television signal processing therefor (of colour signals H04N 9/79) **[3]**
5/911 . . . for the suppression of noise **[6]**
5/913 . . . for scrambling (scrambling of a television signal for transmission H04N 7/167) **[6]**
5/915 . . . for field- or frame-skip recording or reproducing **[6]**
5/917 . . . for bandwidth reduction (bandwidth reduction H04N 7/12; using pulse code modulation H04N 7/24) **[6]**
5/92 . . . Transformation of the television signal for recording, e.g. modulation, frequency changing; Inverse transformation for playback **[3]**
5/921 . . . . by recording or reproducing the baseband signal **[6]**
5/922 . . . . by modulation of the signal on a carrier wave, e.g. amplitude or frequency modulation **[6]**
5/923 . . . . using preemphasis of the signal before modulation and deemphasis of the signal after demodulation **[6]**
5/924 . . . . using duty cycle modulation **[6]**
5/926 . . . . by pulse code modulation (H04N 5/917 takes precedence) **[6]**
5/928 . . . . the sound signal being pulse code modulated and recorded in time division multiplex with the modulated video signal **[6]**
5/93 . . . Regeneration of the television signal or of selected parts thereof **[3]**
5/931 . . . . for restoring the level of the reproduced signal **[6]**
5/932 . . . . Regeneration of analogue synchronisation signals **[6]**
5/935 . . . . Regeneration of digital synchronisation signals **[6]**
5/937 . . . . by assembling picture element blocks in an intermediate store **[6]**
5/94 . . . . Signal drop-out compensation **[3]**
5/95 . . . . Time-base error compensation **[3]**

7/00 **Television systems** (details H04N 3/00, H04N 5/00; specially adapted for colour television H04N 11/00; stereoscopic television systems H04N 13/00) **[4]**
7/01 . Conversion of standards **[4]**
7/015 . High-definition television systems **[6]**
7/025 . Systems for transmission of digital non-picture data, e.g. of text during the active part of a television frame **[6]**
7/03 . . Subscription systems therefor **[6]**
7/035 . . Circuits for the digital non-picture data signal, e.g. for slicing of the data signal, for regeneration of the data-clock signal, for error detection or correction of the data signal **[6]**
7/04 . Systems for the transmission of one television signal, i.e. both picture and sound, by a single carrier **[4]**
7/06 . Systems for the simultaneous transmission of one television signal, i.e. both picture and sound, by more than one carrier **[4]**

7/08 . Systems for the simultaneous or sequential transmission of more than one television signal, e.g. additional information signals, the signals occupying wholly or partially the same frequency band **[4,6]**
7/081 . . the additional information signals being transmitted by means of a subcarrier **[6]**
7/083 . . with signal insertion during the vertical and the horizontal blanking interval **[6]**
7/084 . . with signal insertion during the horizontal blanking interval **[6]**
7/087 . . with signal insertion during the vertical blanking interval **[4]**
7/10 . Adaptations for transmission by electrical cable (H04N 7/12 takes precedence) **[4]**
7/12 . Systems in which the television signal is transmitted via one channel or a plurality of parallel channels, the bandwidth of each channel being less than the bandwidth of the television signal (H04N 7/24 takes precedence; high-definition television systems H04N 7/015) **[4]**
7/14 . Systems for two-way working (H04N 7/173 takes precedence) **[4]**
7/15 . . Conference systems (telephonic conference arrangements H04M 3/56) **[5]**
7/16 . Secrecy systems; Subscription systems
7/167 . . Systems rendering the television signal unintelligible and subsequently intelligible **[4]**
7/169 . . . Systems operating in the time domain of the television signal **[6]**
7/171 . . . Systems operating in the amplitude domain of the television signal **[6]**
7/173 . . with two-way working, e.g. subscriber sending a programme selection signal **[4]**
7/18 . Closed-circuit television systems, i.e. systems in which the signal is not broadcast
7/20 . Adaptations for transmission via a GHz frequency band, e.g. via satellite **[4]**
7/22 . Adaptations for optical transmission **[4]**
7/24 . Systems for the transmission of television signals using pulse code modulation **[6]**
7/26 . . using bandwidth reduction (information reduction by code conversion in general H03M 7/30) **[6]**
7/30 . . . involving transform coding (H04N 7/50 takes precedence; digital computers for performing complex mathematical operations, e.g. domain transformation, G06F 17/14) **[6]**
7/32 . . . involving predictive coding (H04N 7/48, H04N 7/50 take precedence) **[6]**
7/34 . . . . using spatial prediction **[6]**
7/36 . . . . using temporal prediction **[6]**
7/38 . . . . involving delta modulation (systems using differential pulse code modulation in general H04B 14/02) **[6]**
7/42 . . . . involving differential modulation (systems using differential pulse code modulation in general H04B 14/02) **[6]**
7/46 . . . . using subsampling at the coder and sample restitution by interpolation at the coder or decoder **[6]**
7/48 . . . involving pulse code modulation and predictive coding **[6]**
7/50 . . . involving transform and predictive coding **[6]**
7/52 . . Systems for transmission of a pulse code modulated video signal with one or more other pulse code modulated signals, e.g. an audio signal, a synchronising signal **[6]**
7/64 . . Systems for detection or correction of transmission errors (coding, decoding or code conversion for error detection or error correction in general H03M 13/00) **[6]**

9/00 Details of colour television systems [4]
9/04 . Picture signal generators **[4]**
9/07 . . with one pick-up device only **[2,4]**
9/077 . . . whereby the colour signals are characterised by their phase **[4]**
9/083 . . . whereby the colour signals are characterised by their frequency **[4]**
9/09 . . with more than one pick-up device **[4]**
9/10 . . using optical-mechanical scanning means only (H04N 9/11 takes precedence; optical scanning systems in general G02B 26/10) **[2,4]**
9/11 . . Scanning of colour motion picture films, e.g. for telecine **[2,4]**
9/12 . Picture reproducers (H04N 9/11 takes precedence; devices or arrangements for the electro-, magneto- or acousto-optical modulation or deflection of light beams G02F) **[2,4]**
9/16 . . using cathode ray tubes (H04N 9/11 takes precedence; cathode-ray tubes H01J 31/00) **[2,4]**
9/28 . . . Arrangements for convergence or focusing **[4]**
9/285 . . . . using quadrupole lenses (quadrupole lenses per se G21K 1/00, H01J 3/00, H01J 29/58, H01J 37/10) **[4]**
9/31 . . Projection devices for colour picture display **[2,4]**
9/44 . Colour synchronisation **[4]**
9/64 . Circuits for processing colour signals (H04N 9/77 takes precedence) **[4]**
9/65 . . for synchronous modulators **[4]**
9/66 . . for synchronous demodulators **[4]**
9/67 . . for matrixing **[4]**
9/68 . . for controlling the amplitude of colour signals, e.g. automatic chroma control circuits (H04N 9/70, H04N 9/73 take precedence) **[4]**
9/69 . . . for modifying the colour signals by gamma correction **[4]**
9/70 . . for colour killing **[4]**
9/72 . . for reinsertion of dc and slowly varying components of colour signals **[4]**
9/73 . . colour balance circuits, e.g. white balance circuits, colour temperature control **[4]**
9/74 . . for obtaining special effects (H04N 9/65 to H04N 9/73 take precedence) **[4]**
9/75 . . . Chroma key **[4]**
9/76 . . . for mixing of colour signals (H04N 9/75 takes precedence) **[4]**
9/77 . Circuits for processing the brightness signal and the chrominance signal relative to each other, e.g. adjusting the phase of the brightness signal relative to the colour signal, correcting differential gain or differential phase (circuits for matrixing H04N 9/67) **[4]**
9/78 . . for separating the brightness signal or the chrominance signal from the colour television signal, e.g. using comb filter **[4]**
9/79 . Processing of colour television signals in connection with recording **[4]**

9/793 . . for controlling the level of the chrominance signal, e.g. by means of automatic chroma control circuits **[6]**

9/797 . . for recording the signal in a plurality of channels, the bandwidth of each channel being less than the bandwidth of the signal (H04N 9/804, H04N 9/81, H04N 9/82 take precedence) **[6]**

9/80 . . Transformation of the television signal for recording, e.g. modulation, frequency changing; Inverse transformation for playback **[4]**

9/802 . . . involving processing of the sound signal (H04N 9/804, H04N 9/82 take precedence) **[6]**

9/804 . . . involving pulse code modulation of the colour picture signal components **[6]**

9/808 . . . involving pulse code modulation of the composite colour video-signal **[6]**

9/81 . . . the individual colour picture signal components being recorded sequentially only **[4]**

9/82 . . . the individual colour picture signal components being recorded simultaneously only **[4]**

9/86 . . . the individual colour picture signal components being recorded sequentially and simultaneously, e.g. corresponding to SECAM-system **[4]**

9/87 . . Regeneration of colour television signals (H04N 9/80 takes precedence) **[4]**

9/89 . . . Time-base error compensation **[4]**

11/00 **Colour television systems** (details H04N 9/00; stereoscopic H04N 15/00) **[4]**

11/04 . using pulse code modulation **[4]**

11/06 . Transmission systems characterised by the manner in which the individual colour picture signal components are combined **[4]**

13/00 **Stereoscopic television systems**; **Details thereof** (specially adapted for colour television H04N 15/00) **[4]**

13/02 . Picture signal generators **[4]**

13/04 . Picture reproducers **[4]**

15/00 **Stereoscopic colour television systems**; **Details thereof [4]**

17/00 **Diagnosis, testing or measuring for television systems or their details [4]**

17/02 . for colour television signals **[4]**

17/04 . for receivers **[4]**

17/06 . for recorders **[4]**

H04Q ***SELECTING*** *(switches, relays, selectors H01H; wireless communication networks H04W)* **[1,2009.01]**

Notes

(1) This subclass covers :
- methods, circuits, or apparatus for establishing selectively a connection between a desired number of stations (normally two), or between a main station and a desired number of substations (normally one) for the purpose of transferring information via this connection after it has been established;
- *selective calling arrangements over connections already established.* **[2009.01]**

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
- "subscriber" is a general term for terminal equipment, e.g. telephone for public use;
- "substation" means a subscriber or monitoring equipment which may connect a single subscriber to a line without choice as to subscriber;
- "satellite" is a kind of exchange the operation of which depends upon control signals received from a supervisory exchange;
- "switching centres" includes exchanges and satellites.

Subclass Index

1/00 **Details of selecting apparatus or arrangements** (details of selector switches H01H 63/00)

1/02 . Constructional details

1/18 . Electrical details

1/30 . . Signalling arrangements; Manipulation of signalling currents (multiplex systems providing for calling or supervisory signals H04J 1/00, H04J 3/12; telephone substation equipment H04M 1/00)

3/00 **Selecting arrangements** (H04Q 5/00 to H04Q 11/00 take precedence)

3/02 . Circuit arrangements for selectors responsive to a permutation code

3/04 . Circuit arrangements for receivers of routing digits

3/18 . Circuit arrangements for first stage of hunting switching

3/32 . Circuit arrangements for second or subsequent stages of hunting switching **[2]**

3/42 . Circuit arrangements for indirect selecting controlled by common circuits, e.g. register controller, marker

3/44 . . using revertive control

3/46 . . using signals other than revertive impulses

3/47 . . using translators

3/48 . . using markers

3/52 . . using static devices in switching stages, e.g. electronic switching arrangements **[2]**

3/54 . . in which the logic circuitry controlling the exchange is centralised

3/545 . . . using a stored programme **[4]**

3/56 . . in which the control signals are multiplexed **[2]**

3/58 . Arrangements providing connection between main exchange and sub-exchange or satellite

3/60 . . for connecting to satellites or concentrators which connect one or more exchange lines with a group of local lines

3/62 . . for connecting to private branch exchanges

3/64 . Distributing or queuing
3/70 . Identification of class of calling subscriber
3/72 . Finding out and indicating number of calling subscriber
3/76 . Translation from the called subscriber's number to the outgoing or incoming control information **[4]**
3/78 . Temporary storage of information of calling or called subscriber (intermediate storage means for telegraphic communication H04L 13/08) **[4]**

5/00 Selecting arrangements wherein two or more subscriber stations are connected by the same line to the exchange

9/00 Arrangements in telecontrol or telemetry systems for selectively calling a substation from a main station, in which substation desired apparatus is selected for applying a control signal thereto or for obtaining measured values therefrom
9/02 . Automatically-operated arrangements
9/04 . Arrangements for synchronous operation
9/06 . Calling by using amplitude or polarity of dc
9/08 . Calling by using continuous ac
9/14 . Calling by using pulses

11/00 Selecting arrangements for multiplex systems (multiplex systems H04J)
11/04 . for time-division multiplexing
11/06 . . Time-space-time switching **[5]**
11/08 . . Time only switching **[5]**

H04R LOUDSPEAKERS, MICROPHONES, GRAMOPHONE PICK-UPS OR LIKE ACOUSTIC ELECTROMECHANICAL TRANSDUCERS; **DEAF-AID SETS**; **PUBLIC ADDRESS SYSTEMS** (generating mechanical vibrations in general B06B; transducers for measuring particular variables G01; transducers in clocks G04; producing sounds with frequency not determined by supply frequency G10K; transducers in recording or reproducing heads G11B; transducers in motors H02) **[6]**

Notes

(1) This subclass covers:
– loudspeakers, microphones, gramophone pick-ups or like transducers producing acoustic waves or variations of electric current or voltage;
– arrangements actuated by variations of electric current or voltage for cutting grooves in records;
– circuits for the above-mentioned arrangements;
– monitoring or testing the above-mentioned equipment.

(2) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

Subclass Index

1/00 Details of transducers (diaphragms H04R 7/00; characterised by the nature of the transducer, see the relevant group of main groups H04R 9/00 to H04R 23/00; mounting radio sets or communication systems in helmets A42B 3/04; mountings specially adapted for telephone equipment H04M 1/02)
1/02 . Casings; Cabinets; Mountings therein (H04R 1/28 takes precedence)
1/04 . . Structural association of microphone with electric circuitry therefor (in deaf-aid sets H04R 25/00)
1/06 . Arranging circuit leads; Relieving strain on circuit leads
1/08 . Mouthpieces; Attachments therefor
1/10 . Earpieces; Attachments therefor
1/12 . Sanitary or hygienic devices for mouthpieces or earpieces, e.g. for protecting against infection
1/20 . Arrangements for obtaining desired frequency or directional characteristics (for stereophonic purposes H04R 5/00; speech enhancement by processing of the speech signal G10L 21/00)
1/22 . . for obtaining desired frequency characteristic only (circuits for combining transducers having different responses H04R 3/00)
1/28 . . . Transducer mountings or enclosures designed for specific frequency response; Transducer enclosures modified by provision of mechanical or acoustic impedances, e.g. resonator, damping means
1/32 . . for obtaining desired directional characteristic only
1/40 . . . by combining a number of identical transducers
1/44 . Special adaptations for subaqueous use, e.g. for hydrophone

3/00 **Circuits for transducers** (for stereophonic arrangements H04R 5/00; arrangements for producing a reverberation or echo sound G10K 15/08; amplifiers H03F)

3/02 . for preventing acoustic reaction

3/04 . for correcting frequency response

3/12 . for distributing signals to two or more loud-speakers

5/00 **Stereophonic arrangements** (stereophonic pick-ups H04R 9/00, H04R 11/00, H04R 17/04, H04R 19/00)

Note

In this group, the following expression is used with the meaning indicated:
– "stereophonic arrangements" covers quadraphonic or similar arrangements. **[3]**

5/02 . Spatial or constructional arrangements of loud-speakers

7/00 **Diaphragms for electromechanical transducers** (in general F16J 3/00); **Cones** (for musical instruments G10)

9/00 **Transducers of moving-coil, moving-strip, or moving-wire type**

11/00 **Transducers of moving-armature or moving-core type** (acoustic diaphragm of magnetisable material directly co-acting with electromagnet H04R 13/00)

13/00 **Transducers having an acoustic diaphragm of magnetisable material directly co-acting with electromagnet**

15/00 **Magnetostrictive transducers** (magnetostrictive elements in general H01L 41/00)

17/00 **Piezo-electric transducers**; **Electrostrictive transducers** (piezo-electric or electrostrictive elements in general H01L 41/00; details of piezo-electric or electrostrictive motors, generators or positioners H02N 2/00)

17/02 . Microphones

17/04 . Gramophone pick-ups using a stylus; Recorders using a stylus

17/10 . Resonant transducers, i.e. adapted to produce maximum output at a predetermined frequency

19/00 **Electrostatic transducers**

21/00 **Variable-resistance transducers** (gaseous-resistance transducers H04R 23/00; magneto-resistive transducers H04R 23/00)

23/00 **Transducers other than those covered by groups H04R 9/00 to H04R 21/00**

25/00 **Deaf-aid sets** (constructions of transducers per se H04R 9/00 to H04R 23/00; structural combination with spectacle frames G02C 11/00; processing of speech signals G10L 21/00)

25/02 . adapted to be supported entirely by ear

25/04 . comprising pocket amplifiers

27/00 **Public address systems** (circuits for preventing acoustic reaction H04R 3/02; circuits for distributing signals to loud-speakers H04R 3/12; amplifiers H03F)

29/00 **Monitoring arrangements**; **Testing arrangements**

31/00 **Apparatus or processes specially adapted for the manufacture of transducers or diaphragms therefor** (processes or apparatus specially adapted for the manufacture of micro-structural devices or systems, e.g. in combination with electrical devices, B81C)

H04S **STEREOPHONIC SYSTEMS** (information storage on discs or tapes G11B; broadcast systems for the distribution of stereophonic information H04H 20/88; multiplex systems in general H04J) **[3]**

Note

In this subclass, the following expression is used with the meaning indicated:
– "stereophonic systems" covers quadraphonic or similar systems. **[3]**

1/00 **Two-channel systems** (H04S 5/00, H04S 7/00 take precedence) **[3]**

3/00 **Systems employing more than two channels, e.g. quadraphonic** (H04S 5/00, H04S 7/00 take precedence) **[3]**

5/00 **Pseudo-stereo systems, e.g. in which additional channel signals are derived from monophonic signals by means of phase shifting, time delay or reverberation** (arrangements for producing a reverberation or echo sound G10K 15/08) **[3]**

7/00 **Indicating arrangements**; **Control arrangements, e.g. balance control [3]**

H04W WIRELESS COMMUNICATION NETWORKS **[2009.01]**

Notes

(1) *This subclass covers:*
- *communication networks for selectively establishing one or a plurality of wireless communication links between a desired number of users or between users and network equipment, for the purpose of transferring information via these wireless communication links;* **[2009.01]**
- *networks deploying an infrastructure for mobility management of wireless users connected thereto, e.g. cellular networks, WLAN [Wireless Local Area Network], wireless access networks, e.g. WLL [Wireless Local Loop] or self-organising wireless communication networks, e.g. ad hoc networks;* **[2009.01]**
- *planning or deployment specially adapted for the above-mentioned wireless networks;* **[2009.01]**
- *services or facilities specially adapted for the above-mentioned wireless networks;* **[2009.01]**
- *arrangements or techniques specially adapted for the operation of the above-mentioned wireless networks.* **[2009.01]**

(2) *This subclass does not cover :*
- *communication systems using wireless extensions, i.e. wireless links without selective communication, e.g. cordless telephones, which are covered by group H04M 1/72;* **[2009.01]**
- *broadcast communication, which is covered by subclass H04H.* **[2009.01]**

(3) *In this subclass, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.* **[2009.01]**

4/00 ***Services or facilities specially adapted for wireless communication networks*** **[2009.01]**

4/02 . *Services making use of the location of users or terminals* **[2009.01]**

4/06 . *Selective distribution of broadcast; Services to user groups; One-way selective calling services* **[2009.01]**

4/12 . *Messaging, e.g. SMS [Short Messaging Service]; Mailboxes; Announcements, e.g. informing users on the status or progress of a communication request* **[2009.01]**

4/16 . *Communication-related supplementary services, e.g. call-transfer or call-hold* **[2009.01]**

4/18 . *Information format or content conversion, e.g. adaptation by the network of the transmitted or received information for the purpose of wireless delivery to users or terminals* **[2009.01]**

4/20 . *Auxiliary data signalling, i.e. transmitting data via a non-traffic channel* **[2009.01]**

4/22 . *Emergency connection handling* **[2009.01]**

4/24 . *Accounting or billing* **[2009.01]**

8/00 ***Network data management*** **[2009.01]**

8/02 . *Processing of mobility data, e.g. registration information at HLR [Home Location Register] or VLR [Visitor Location Register]; Transfer of mobility data, e.g. between HLR, VLR or external networks* **[2009.01]**

8/18 . *Processing of user or subscriber data, e.g. subscribed services, user preferences or user profiles; Transfer of user or subscriber data* **[2009.01]**

8/22 . *Processing or transfer of terminal data, e.g. status or physical capabilities* **[2009.01]**

12/00 ***Security arrangements, e.g. access security or fraud detection; Authentication, e.g. verifying user identity or authorisation; Protecting privacy or anonymity*** **[2009.01]**

16/00 ***Network planning, e.g. coverage or traffic planning tools; Network deployment, e.g. resource partitioning or cell structures*** **[2009.01]**

24/00 ***Supervisory, monitoring or testing arrangements*** **[2009.01]**

28/00 ***Network traffic or resource management*** **[2009.01]**

28/02 . *Traffic management, e.g. flow control or congestion control* **[2009.01]**

28/16 . *Central resource management; Negotiation of resources, e.g. negotiating bandwidth or QoS [Quality of Service]* **[2009.01]**

36/00 ***Handoff or reselecting arrangements*** **[2009.01]**

40/00 ***Communication routing or communication path finding*** **[2009.01]**

40/02 . *Communication route or path selection, e.g. power-based or shortest path routing* **[2009.01]**

40/24 . *Connectivity information management, e.g. connectivity discovery or connectivity update* **[2009.01]**

48/00 ***Access restriction; Network selection; Access point selection*** **[2009.01]**

52/00 ***Power management, e.g. TPC [Transmission Power Control], power saving or power classes*** **[2009.01]**

56/00 ***Synchronisation arrangements*** **[2009.01]**

60/00 ***Registration, e.g. affiliation to network; De-registration, e.g. terminating affiliation*** **[2009.01]**

64/00 ***Locating users or terminals for network management purposes, e.g. mobility management*** **[2009.01]**

68/00 ***Notification of users, e.g. alerting for incoming communication or change of service*** **[2009.01]**

72/00 ***Local resource management, e.g. selection or allocation of wireless resources or wireless traffic scheduling*** **[2009.01]**

74/00 ***Wireless channel access, e.g. scheduled or random access*** **[2009.01]**

76/00 ***Connection management, e.g. connection set-up, manipulation or release*** **[2009.01]**

80/00 ***Wireless network protocols or protocol adaptations to wireless operation, e.g. WAP [Wireless Application Protocol]*** **[2009.01]**

84/00 ***Network topologies*** **[2009.01]**

84/02 . *Hierarchically pre-organised networks, e.g. paging networks, cellular networks, WLAN [Wireless Local Area Network] or WLL [Wireless Local Loop]* **[2009.01]**

84/18 . *Self-organising networks, e.g. ad hoc networks or sensor networks* **[2009.01]**

88/00 ***Devices specially adapted for wireless communication networks, e.g. terminals, base stations or access point devices*** **[2009.01]**

92/00 ***Interfaces specially adapted for wireless communication networks*** **[2009.01]**

99/00 ***Subject matter not provided for in other groups of this subclass*** **[2009.01]**

H05 ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

H05B **ELECTRIC HEATING**; **ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR** (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)

Note

Attention is drawn to Note III following the Contents of Section of section H. **[3]**

Subclass Index

Heating

1/00 **Details of electric heating devices**

1/02 . Automatic switching arrangements specially adapted to heating apparatus (control of temperature in general G05D 23/00; thermally-actuated switches H01H 37/00)

3/00 **Ohmic-resistance heating**

3/02 . Details

3/06 . . Heater elements structurally combined with coupling elements or with holders

3/10 . Heating elements characterised by the composition or nature of the materials or by the arrangement of the conductor (compositions per se, see the relevant subclasses)

3/12 . . characterised by the composition or nature of the conductive material

3/14 . . . the material being non-metallic

3/16 . . the conductor being mounted on an insulating base

3/20 . Heating elements having extended surface area substantially in a two-dimensional plane, e.g. plate-heater (H05B 3/62, H05B 3/68, H05B 3/78, H05B 3/84 take precedence) **[5]**

3/22 . . non-flexible

3/34 . . flexible, e.g. heating nets or webs

3/40 . Heating elements having the shape of rods or tubes (H05B 3/62, H05B 3/68, H05B 3/78 take precedence)

3/42 . . non-flexible

3/54 . . flexible

3/60 . Heating arrangements wherein the heating current flows through granular, powdered or fluid material, e.g. for salt-bath furnace, electrolytic heating (H05B 3/34 takes precedence)

3/62 . Heating elements specially adapted for furnaces (H05B 3/60 takes precedence; arrangements of such elements in furnaces F27, e.g. F27D 11/00)

3/68 . Heating arrangements specially adapted for cooking plates or analogous hot-plates

3/78 . Heating arrangements specially adapted for immersion heating

3/84 . Heating arrangements specially adapted for transparent or reflecting areas, e.g. for demisting or de-icing windows, mirrors or vehicle windshields **[5]**

6/00 **Heating by electric, magnetic, or electromagnetic fields** (for therapeutic purposes A61N 5/00; joining of preformed parts by heating of plastics or substances in a plastic state B29C 65/02) **[3]**

6/02 . Induction heating **[3]**

6/06 . . Control, e.g. of temperature, of power **[3]**

6/10 . . Induction heating apparatus, other than furnaces, for specific applications **[3]**

6/12 . . . Cooking devices **[3]**

6/14 . . . Tools, e.g. nozzles, rollers, calenders **[3]**

6/36 . . Coil arrangements **[3]**

6/64 . Heating using microwaves **[3]**

6/66 . . Circuits **[3]**

6/68 . . . for monitoring or control **[3]**

6/70 . . Feed lines **[3]**

6/72 . . Radiators or aerials **[3]**

6/74 . . Mode transformers or mode stirrers **[3]**

6/76 . . Prevention of microwave leakage, e.g. door sealings **[3]**

6/78 . . Arrangements for continuous movement of material **[3]**

6/80 . . Apparatus for specific applications (stoves or ranges F24C 7/02) **[3]**

7/00 **Heating by electric discharge** (electron beam or ion beam tubes for localised treatment of objects H01J 37/30; plasma torches H05H 1/26)

11/00 **Heating by combined application of processes covered by two or more of groups H05B 3/00 to H05B 7/00** (H05B 7/00 takes precedence)

Lighting

31/00 **Electric arc lamps** (regulating electric characteristics of arcs G05F 1/02; with non-consumable electrodes H01J 61/00)

33/00 **Electroluminescent light sources** (discharge lamps H01J 61/00 to H01J 65/00; semi-conductor devices with at least one particular jump barrier or surface barrier specially adapted for light emission H01L 27/15, H01L 33/00; organic light emitting devices H01L 27/28, H01L 51/50; lasers H01S 3/00, H01S 5/00; compositions per se, see the relevant subclasses) **[1,8]**

33/02 . Details

33/04 . . Sealing arrangements

33/10 . Apparatus or processes specially adapted to the manufacture of electroluminescent light sources

33/12 . Light sources with substantially two-dimensional radiating surfaces

33/14 . . characterised by the chemical or physical composition or the arrangement of the electroluminescent material

33/22 . . characterised by the chemical or physical composition or the arrangement of auxiliary dielectric or reflective layers

33/24 . . . of metallic reflective layers (H05B 33/26 takes precedence)

33/26 . . characterised by the composition or arrangement of the conductive material used as an electrode

35/00 **Electric light sources using a combination of different types of light generation**

37/00 **Circuit arrangements for electric light sources in general**

37/02 . Controlling

39/00 **Circuit arrangements or apparatus for operating incandescent light sources and not adapted to a particular application**

41/00 **Circuit arrangements or apparatus for igniting or operating discharge lamps**

41/14 . Circuit arrangements

41/16 . . in which the lamp is fed by dc or by low-frequency ac, e.g. by 50 cycles/sec ac (H05B 41/26 takes precedence)

41/18 . . . having a starting switch

41/20 . . . having no starting switch

41/24 . . in which the lamp is fed by high-frequency ac (H05B 41/26 takes precedence)

41/26 . . in which the lamp is fed by power derived from dc by means of a converter, e.g. by high-voltage dc

41/28 . . . using static converters

41/30 . . in which the lamp is fed by pulses, e.g. flash lamp

41/36 . . Controlling

41/38 . . . Controlling the intensity of light

41/39 . . . . continuously

43/00 **Circuit arrangements for light sources, not otherwise provided for** (H05B 37/00 takes precedence)

H05C **ELECTRIC CIRCUITS OR APPARATUS SPECIALLY DESIGNED FOR USE IN EQUIPMENT FOR KILLING, STUNNING, ENCLOSING OR GUIDING LIVING BEINGS** (stationary means for catching or killing insects by electric means A01M 1/00; apparatus for the destruction of noxious animals, other than insects, by electricity A01M 19/00; electric traps for animals A01M 23/00; scaring devices for animals A01M 29/00; slaughtering or stunning by electric current A22B 3/00)

1/00 **Circuits or apparatus for generating electric shock effects**

3/00 **Other circuits or apparatus**

H05F **STATIC ELECTRICITY**; **NATURALLY-OCCURRING ELECTRICITY** (electrostatic machines H02N; uses of electricity in performing operations, e.g. precipitation, see the relevant subclasses for the operations)

Notes

(1) This subclass covers methods or arrangements for preventing the formation of electrostatic charges on bodies or for carrying-off these charges after their formation.

(2) This subclass does not cover specific applications of the above-mentioned methods or arrangements. Such arrangements are covered by the relevant subclasses, e.g. arrangements in large containers B65D 90/22.

1/00 **Preventing the formation of electrostatic charges**

3/00 **Carrying-off electrostatic charges** (from living beings A61N 1/00)

3/02 . by means of earthing connections

7/00 **Use of naturally-occurring electricity**

H05G **X-RAY TECHNIQUE** (apparatus for radiation diagnosis A61B 6/00; X-ray therapy A61N; testing by X-rays G01N; apparatus for X-ray photography G03B; filters, conversion screens, microscopes G21K; X-ray tubes H01J 35/00; TV systems having X-ray input H04N 5/321)

1/00 **X-ray apparatus involving X-ray tubes**; **Circuits therefor**

2/00 **Apparatus or processes specially adapted for producing X-rays, not involving X-ray tubes, e.g. involving generation of a plasma** (X-ray lasers H01S 4/00; plasma technique in general H05H) **[5]**

H05H **PLASMA TECHNIQUE** (ion-beam tubes H01J 27/00; magnetohydrodynamic generators H02K 44/00; producing X-rays involving plasma generation H05G 2/00); **PRODUCTION OF ACCELERATED ELECTRICALLY- CHARGED PARTICLES OR OF NEUTRONS** (obtaining neutrons from radioactive sources G21, e.g. G21B, G21C, G21G); **PRODUCTION OR ACCELERATION OF NEUTRAL MOLECULAR OR ATOMIC BEAMS** (atomic clocks G04F 5/00; devices using stimulated emission H01S; frequency regulation by comparison with a reference frequency determined by energy levels of molecules, atoms, or subatomic particles H03L 7/26)

Notes

(1) This subclass covers:
(a) generating or handling plasma;
(b) devices not covered by subclass H01J and in which electrons, ion beams, or neutral particles are accelerated to high energies;
(c) devices for producing neutral particle beams; **[3]**
(d) targets for (a), (b), or (c). **[3]**

(2) Attention is drawn to subclass G21K. **[3]**

Subclass Index

1/00 **Generating plasma**; **Handling plasma** (application of plasma technique in thermonuclear fusion reactors G21B 1/00)

1/02 . Arrangements for confining plasma by electric or magnetic fields; Arrangements for heating plasma (electron optics H01J)

1/24 . Generating plasma **[2]**

1/26 . . Plasma torches **[2]**

1/46 . . using applied electromagnetic fields, e.g. high frequency or microwave energy (H05H 1/26 takes precedence) **[3]**

3/00 **Production or acceleration of neutral particle beams, e.g. molecular or atomic beams [3]**

5/00 **Direct voltage accelerators**; **Accelerators using single pulses** (H05H 3/00 takes precedence) **[5]**

6/00 **Targets for producing nuclear reactions** (supports for targets or objects to be irradiated G21K 5/00) **[3]**

7/00 **Details of devices of the types covered by groups H05H 9/00 to H05H 13/00** (targets for producing nuclear reactions H05H 6/00) **[3]**

7/14 . Vacuum chambers (H05H 5/00 takes precedence) **[4]**

9/00 **Linear accelerators** (H05H 11/00 takes precedence)

11/00 **Magnetic induction accelerators, e.g. betatrons**

13/00 **Magnetic resonance accelerators**; **Cyclotrons**

13/04 . Synchrotrons

15/00 **Methods or devices for acceleration of charged particles not otherwise provided for [4]**

H05K **PRINTED CIRCUITS**; **CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS**; **MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS** (details of instruments or comparable details of other apparatus not otherwise provided for G12B; thin-film or thick-film circuits H01L 27/01, H01L 27/13; non-printed means for electric connections to or between printed circuits H01R; casings for, or constructional details of, particular types of apparatus, see the relevant subclasses; processes involving only a single technical art, e.g. heating, spraying, for which provision exists elsewhere, see the relevant classes)

Notes

(1) This subclass covers:
- combinations of a radio or television receiver with apparatus having a different main function;
- printed circuits structurally associated with non-printed electric components.

(2) In this subclass, the following expression is used with the meaning indicated:
- "printed circuits" covers all kinds of mechanical constructions of circuits that consist of an insulating base or support carrying the conductor and are combined structurally with the conductor throughout their length, especially in a two-dimensional plane, the conductors of which are secured to the base in a non-dismountable manner, and also covers the processes or apparatus for manufacturing such constructions, e.g. forming the circuit by mechanical or chemical treatment of a conductive foil, paste, or film on an insulating support.

Subclass Index

1/00 **Printed circuits** (assemblies of a plurality of individual semiconductor or solid state devices H01L 25/00; devices consisting of a plurality of solid state components formed in or on a common substrate, e.g. integrated circuits, thin-film or thick-film circuits, H01L 27/00)

1/02 . Details

1/03 . . Use of materials for the substrate **[3]**

1/05 . . . Insulated metal substrate **[3]**

1/09 . . Use of materials for the metallic pattern **[3]**

1/11 . . Printed elements for providing electric connections to or between printed circuits **[3]**

1/14 . . Structural association of two or more printed circuits (providing electric connection to or between printed circuits H05K 1/11, H01R 12/00)

1/16 . incorporating printed electric components, e.g. printed resistor, capacitor, inductor

1/18 . Printed circuits structurally associated with non-printed electric components (H05K 1/16 takes precedence)

3/00 **Apparatus or processes for manufacturing printed circuits** (photomechanical production of textured or patterned surfaces, materials or originals therefor, apparatus specially adapted therefor, in general G03F; involving the manufacture of semiconductor devices H01L) **[3]**

3/02 . in which the conductive material is applied to the surface of the insulating support and is thereafter removed from such areas of the surface which are not intended for current conducting or shielding

3/06 . . the conductive material being removed chemically or electrolytically, e.g. by photo-etch process

3/07 . . . being removed electrolytically **[3]**

3/10 . in which conductive material is applied to the insulating support in such a manner as to form the desired conductive pattern

3/12 . . using printing techniques to apply the conductive material

3/14 . . using spraying techniques to apply the conductive material

3/18 . . using precipitation techniques to apply the conductive material

3/20 . . by affixing prefabricated conductor pattern

3/22 . Secondary treatment of printed circuits

3/24 . . Reinforcing of the conductive pattern

3/26 . . Cleaning or polishing of the conductive pattern

3/28 . . Applying non-metallic protective coatings

3/30 . Assembling printed circuits with electric components, e.g. with resistor

3/32 . . electrically connecting electric components or wires to printed circuits

3/34 . . . by soldering

3/36 . Assembling printed circuits with other printed circuits

3/38 . Improvement of the adhesion between the insulating substrate and the metal **[3]**

3/40 . Forming printed elements for providing electric connections to or between printed circuits **[3]**

3/42 . . Plated through-holes **[3]**

3/44 . Manufacturing insulated metal core circuits **[3]**

3/46 . Manufacturing multi-layer circuits **[3]**

5/00 **Casings, cabinets or drawers for electric apparatus** (in general A47B; radio receiver cabinets H04B 1/08; television receiver cabinets H04N 5/64)

5/02 . Details

5/03 . . Covers

5/04 . Metal casings

5/06 . Hermetically-sealed casings

7/00 **Constructional details common to different types of electric apparatus** (casings, cabinets, drawers H05K 5/00)

7/02 . Arrangements of circuit components or wiring on supporting structure

7/04 . . on conductive chassis

7/10 . . Plug-in assemblages of components

7/12 . . Resilient or clamping means for holding component to structure (holding two-part couplings together H01R 13/00)

7/14 . Mounting supporting structure in casing or on frame or rack

7/16 . . on hinges or pivots

7/18 . Construction of rack or frame

7/20 . Modifications to facilitate cooling, ventilating, or heating

9/00 **Screening of apparatus or components against electric or magnetic fields** (devices for absorbing radiation from an aerial H01Q 17/00)

10/00 **Arrangements for improving the operating reliability of electronic equipment, e.g. by providing a similar stand-by unit**

Note

Attention is drawn to the following appropriate places:
[6]

G05B	9/03	Electric redundant control systems
G06F	11/16	Error detection or correction of data by redundancy in digital computer hardware
G08B	29/00	Security signalling or alarm systems
H02H	3/05	Redundant emergency protective circuit arrangements
H02J	3/38	Arrangements for parallelly feeding a single network
H02J	9/04	Circuit arrangements with stand-by power supply
H03K	19/003	Modifications for increasing the reliability of logic circuits or inverting circuits
H03K	19/007	Fail-safe logic circuits or inverting circuits
H03L	7/07	Redundant clock signal generation in generators of electronic oscillations or pulses
H04B	1/74	Transmission systems using redundant channels or apparatus
H04L	1/22	Redundant apparatus for increasing reliability of arrangements used for the transmission of digital information.

11/00 **Combinations of a radio or television receiver with apparatus having a different main function**

13/00 **Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components**

13/02 . Feeding of components (in general B65G)

13/04 . Mounting of components

13/06 . Wiring by machine

H99 SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

H99Z SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

Note

This subclass covers subject matter that: **[8]**
(a) is not provided for, but is most closely related to, the subject matter covered by the subclasses of this section, and **[8]**
(b) is not explicitly covered by any subclass of another section. **[8]**

99/00 Subject matter not otherwise provided for in this section [8]